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THE CURATIVE INFLUENCE
OF THE
CLIMATE OF PAU.

B. Pereira

with the compliments of

The Author

ON
THE CURATIVE INFLUENCE
OF THE
CLIMATE OF PAU,
AND
THE MINERAL WATERS OF THE PYRENEES,
ON
DISEASE.
WITH
DESCRIPTIVE NOTICES OF THE GEOLOGY, BOTANY, NATURAL
HISTORY, MOUNTAIN SPORTS, LOCAL ANTIQUITIES,
AND TOPOGRAPHY OF THE PYRENEES, AND
THEIR PRINCIPAL WATERING-PLACES.

BY
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THE HISTORIC INSTITUTE OF FRANCE, &c., &c.

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TO

THE VICOMTE NAPOLEON DUCHATEL,

COUNSELLOR OF STATE, PEER OF FRANCE,
§c. §c. §c.

PREFECT OF THE HAUTE GARONNE, AND LATELY PREFECT OF THE
BASSES PYRENEES.

SIR,

To no one can I more appropriately dedicate a Work, having for its object the development of the curative properties of the Climate of Pau, and of the Mineral Waters of the Pyrénées, than to you, who during the period, when the facts contained in it were collected, governed so wisely the department to which it chiefly refers.

Deeply interested as you have been in every thing connected with the welfare of the Pyrénées, you have been kindly pleased to wish success to the present attempt, and to receive graciously the request, that I might be permitted to dedicate it to you.

Independently of my respect for your public and private character, a feeling of gratitude for the

DEDICATION.

professional confidence reposed in me by you makes me but too willingly adopt this opportunity of acknowledging it.

That your country may long congratulate itself in the possession of one, so well qualified to adorn it, is the sincere wish of

Sir,

Your faithful and obliged servant,

THE AUTHOR.

PAU,

June, 1845.

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ON THE
CLIMATE OF PAU,
AND THE
MINERAL WATERS OF THE PYRÉNÉES.

CHAPTER I.
INTRODUCTION.

THERE is, perhaps, no town on the Continent to which the English invalid resorts in search of health, with such manifest advantage in certain classes of disease, so little known to the medical and general public as Pau. Vague rumours, propagated from one to another, have, since the Peace, given it a *name*, but have scarcely conveyed to the English mind any tangible details, or communicated any leading principles as to its climate. For twenty years, Pau has been progressively acquiring a quiet celebrity among an unbroken succession of visitors, who, deriving benefit themselves from the salubrity of its climate, have recommended it to others, supposed to be similarly circumstanced, as a place of temporary sojourn; but no discriminating rules have been laid down to guide the distant invalid, when to

seek, or when to avoid, its climate. Florence and Naples, Pisa and Nice, and every variety of German and Belgian spa, have had their minute historians; but as to Pau, it has been left to the doubtful advantages of a traditionary fame. No English hand, partial or impartial, with the exception of a cursory notice by Sir James Clark, in his work on Climate, has brought forward its claims, sufficiently important in themselves, but rendered more so from its proximity to the watering places of the Pyrénées.

Nor has justice been done in this work of Sir James Clark to the climate of Pau, even in the few observations he has made. Drawing his information, in the gross, from other sources than his own highly discriminating experience, he has affixed a reputation to the qualities of the Pau climate, in reference to some states of disease, which our own observations have convinced us to be unmerited.

Thus, for instance*, he considers that "invalids labouring under, or subject to, attacks of rheumatism should of course avoid Pau." In this sweeping opinion, no distinction appears to have been drawn between the different varieties of rheumatism, or the causes on which they depend. In the sequel it will be shown that rheumatism of an acute character, complicated with gout in nervo-sanguineous tempaments, frequently attended with tonic irritation

* CLARK, *on the Sanative Influence of Climate*, p. 193.

of the digestive organs, and an accelerated state of the pulse, receives most marked palliation of symptoms. And it is in the atonic form of rheumatism and rheumatic gout only, in cachectic habits, debilitated by long residence in hot climates, and where the tone of the digestive organs is very much impaired, and hepatic disease both creates and supports the symptoms, that the climate of Pau is decidedly contra-indicated.

Again, with regard to the relative influence of the climate of Pau, and of the waters of the Pyrénées, in affections of the mucous membranes, it is stated, “Upon the whole, Pau appears to be the most desirable winter residence in the south-west of France for invalids labouring under chronic affections of the mucous membranes. In the same class of diseases, the mineral waters of the Pyrénées are also very beneficial.” From this quotation, one would be led to suppose, that the same character of disease in mucous membranes is indifferently alleviated and cured by both, and that the *modus operandi* is the same: whereas the climate of Pau acts beneficially chiefly in diseases of the mucous membranes of an obstinately sub-acute character,—for instance, of the trachea or bronchi, accompanied by a dry hacking cough, absence of healthy expectoration, and quickened pulse, with emaciation. The waters of the Pyrénées, on the other hand, are distinctly contra-indicated in such a

state of things, and are useful only where the disease is principally marked with diminished tone of structure and increased mucopurulent expectoration. As these matters, however, will be fully discussed hereafter, we shall content ourselves by this passing allusion to the subject for the present.

That the virtues of the climate of Pau and its advantages in other respects, as a place of residence, should have escaped minute and scientific description in detail, ought not to surprise us much, when it is known that there is no work in English on the spas of the Pyrénées. And these claim a higher classic history than others of the Continent, and their curative powers may, without exaggeration, be considered specific (if any remedy be specific) in an important series of membranous and glandular affections.

So little, indeed, has been known of Pau, and of the watering places of the Pyrénées, by the medical faculty in England, that they have been frequently confounded as meaning the same thing. Physicians, otherwise well informed, have been in the habit of sending patients, in all stages of disease, for the benefits derivable from the mineral waters of Pau*; while the only waters it boasts of is the noisy

* The nearest watering places are the *Eaux-Bonnes* and *Eaux-Chaudes*, in the Basses Pyrénées, about twenty-six miles distant; then in the Hautes Pyrénées, Bagnères-en-Bigorre, thirty-six miles; St. Sauveur and Cauterets, forty-five miles;

Gave, working its way from its distant mountain source, under the renowned *Brèche de Roland*,—a name so dear to the lovers of chivalrous romance,—through a valley unparalleled in beauty, and washing the platform on which Pau is built, in its passage to the sea.

It is this ignorance, with regard to the peculiar virtues of any climate, that ultimately tends to bring it into disrepute; since more is expected from a reputation much exaggerated, because frequently depending upon loose gossip, than any climate, however favoured, can perform. How much the history of pharmacy shows this to be the case, with regard to medicines; for frequently some one remedy,—a powerful agent in a limited number of morbid affections,—has come to be viewed with distrust, if not altogether discarded from practice, from its having been indiscriminately applied, or given in improper quantities. And the fate which has attended many favourite places of resort for invalids, may be traced up to a similar cause. Decidedly favourable in the alleviation and cure of a limited number of diseases, they have been tasked, without reason, to perform impossibilities in another train of maladies, either incurable or altogether unsuited to the peculiarities of the climate chosen.

and Barréges, fifty miles. Biarritz, well frequented for sea-bathing, with every convenience for strangers, is seventy miles from Pau. This latter has an establishment of hot sea-water baths and douches.

To suggest some fixed principles applicable to the climate of Pau, and to the mineral waters of the Pyrénées, in reference to their effects upon disease, is the object of the present attempt. A residence of some years in Pau, and annual visits to the watering stations in the mountains in a professional capacity, as well as the kind assistance of native physicians, and a rigid scrutiny of many cases said to have been benefited and cured, are the grounds on which the Author presumes to convey to others his own impressions. He feels the full responsibility of the task, and is aware that he ought not either to conceal, diminish, or exaggerate the evidence in a matter so important to the well-being of a numerous class of the community, who, already weighed down by the pressure of disease, and yet buoyed up by hope, are too apt to be lightly induced in search of a shadow to leave home and friends, and increase their sufferings by a tedious and painful journey, frequently to be deceived. On the other hand, there undoubtedly are many, *very many*, who might ward off the threatened effects of predispositions, both of an hereditary and acquired nature; and others who, ere disease has made deep organic havoc, might be restored to comparative health and strength by a timely recourse to the climate of Pau, and to the curative means of its neighbouring mineral springs.

At an early period, long before Bearn, the

ancient kingdom of which Pau was the capital, became incorporated with France as an integral part, it was renowned for the salubrity of its climate: and there is not wanting in its history the evidence of illustrious names to vouch for its pre-eminence as a most favoured country. At the present day rigid statistics stamp it as *the* province of France, possessing *pur excellence* a climate calculated to promote health, and to subdue certain kinds of disease, both organic and functional.

While, also, to the invalid the waters of the neighbouring mountains, judiciously used, are of surpassing efficacy in the treatment of membranous disease, and a variety of symptoms which follow in its train, the Pyrénées themselves, an almost unexplored country by the English tourist, afford ample field for recreating the mind and invigorating the body.

Here the scholar, the botanist, the mineralogist, the artist, and the sportsman, will find varied and ample occupation. At Bagnères-en-Bigorre, for instance, we are brought back to the days of Augustus Cæsar, the conqueror of Aquitania. Here the antiquary will meet with votive altars erected in that conqueror's time, still in good preservation, and the remains of baths founded by his generals. Nor are antiquities of a later date, when England held sway over this and several other provinces of France, few or uninteresting. On the same moun-

tains the botanist finds the plants of opposite climes; and the geologist has ample opportunities afforded him to test his theories and add to his stock of facts: while the chase of the izzard (the chamois of the Pyrénées), the ibex, the bear, and the wolf, amidst the perennial snows of Mont Perdu, the Maladetta, and the loftiest peaks, afford to the robust and adventurous an interesting and healthy recreation.

Fresh combinations of beauty and grandeur start up before the eyes of the artist at every step; and the tourist may agreeably vary his occupations on the lakes and trout streams, which everywhere abound.

The matters here alluded to can only, in the course of this work, be incidentally described, and then merely in so far as the *distraction* afforded by them may be recommended as an auxiliary to medical regimen, or a relief from *ennui* to those who, being in the possession of good health themselves, are yet compelled by affection or duty to accompany some invalid relative in search of the greatest of earthly blessings. Any notice of scenery must necessarily be meagre and sketchy; but this will scarcely be regretted when recourse may so easily be had to the works of Mrs. Boddington, Mrs. Ellis, Mr. Murray, and Mr. Inglis, and not least in point of interest, although a work of fiction, *The Desultory Man* of Mr. James. And should the Vicomtesse de St. Jean,

an English lady, carry into execution her once expressed intentions of publishing pictorial and descriptive sketches of some of the most interesting parts of Pyrenean scenery, the reader will have ample means of becoming as well acquainted with the general features of the Pyrénées as descriptions can make him, and he will no doubt be excited to form a nearer personal acquaintance with them.

Still, occasionally shall we vary our task in availing ourselves of short quotations from the works of the few who have preceded us in the slightly beaten track of Pyrenean travel; but then, it will only be to lighten the dulness of a work essentially not of an imaginative or descriptive character; and where facts are concerned, to produce disinterested testimony to the statements and opinions in the text.

Various circumstances of a political and social nature connected with Spain, have hitherto, to a great extent, rendered the Pyrénées a veritable barrier to a better acquaintance with that country of romance, where one finds that, amidst the great organic changes which have taken place in the habits and occupations of the inhabitants of other countries, her neighbours, she has clung, and still clings with obstinate fidelity, to her old customs and feelings. Those who have travelled in Spain cannot but be struck with the truth-telling descriptions of Cervantes and Le Sage, and observe how strictly they

apply to the Spaniards of the present day, whose habits and manners betray the little progress that has been made in the acquisition of new tastes, and consequently of solid motives for change in the structure of their political system. The little tendency to *progress*, which one finds in everything connected with the social condition of Spain, and the constitutional passiveness of the national character, may account for the difficulties which have hitherto opposed the introduction of great changes of a political nature, and have rendered their completion next to impossible.

The plan proposed to be pursued in this work is to treat, *first*, of Pau and its climate, and the influence of the latter as it affects the native and foreign population in health and in disease; and *secondly*, to give a description of the more important spas of the Pyrénées, and of the virtues and effects of their respective waters. To this branch of the subject we shall prefix some geological, botanical, and miscellaneous notices of the Pyrénées themselves.

In investigations connected with the climate of any country, with a view to ascertain its influence upon health and disease in persons strangers to it, there are many circumstances to be taken into account. It is not sufficient to content oneself with merely noting the indications afforded by the thermometer and barometer, to describe the nature of the

soil, the state of humidity and of the prevailing winds; but we ought to find out how all these and other scarcely appreciable circumstances combined have influenced and continue to influence the condition of the native population, physically and morally, in health and in disease. We ought to endeavour to discover and describe the causes of their exemption, if any, from those constitutional predispositions as well as diseases, which assail the natives of other countries less favourably circumstanced; and to ascertain any peculiarity of action the climate may have upon the symptoms of existing diseases, and the type which these most generally assume. There can, indeed, be no doubt, as a general fact, that diseases are invariably modified by climate to a very considerable extent.

By this process we may arrive at some useful deductions, which may serve as rules for our decision; first, as to the kind of predisposition to disease in strangers, whose developement may be prevented by a timely recourse to the influence of the climate so tested; and secondly, when actual disease has occurred, as to the quality of the symptoms invariably benefited, relieved, or aggravated. It is not too much to expect, that where, in any given climate, we find among the native population a marked absence, for instance, of a scrofulous or lymphatic habit of body, the same qualities of climate would tend to prevent the developement of

the worst results of such a diathesis, in persons hereditarily predisposed, or whose weakened organization may lay the system open to be acted upon by unfavourable atmospheric agency. Again, if in a given climate we find among the natives, diseases, which, in more exciting regions, run an acute and aggravated career, here assuming milder forms, and this modification arising from the sedative effects of that climate upon the nervous and circulatory systems, it will be a fair and logical deduction to conclude, that diseases of strangers depending upon mixed nervous and arterial irritation, will undergo similar modifications, and thus the course of morbid action be materially checked, if not altogether destroyed. Thus, if in any climate we find that its agency is directly of a sedative kind, and that it proximately acts by modifying the tone of organs, we would *à priori* infer that such a climate would be unsuitable to that kind of diseased action depending upon general atony and a low state of functional energy.

It is for these reasons that we shall take, as the basis of our inquiries, the state of health enjoyed by the native population; the diseases to which they are most subject; the types these diseases assume; the proportion of mortality and longevity, &c. This discussion will naturally bring us to describe the state of health enjoyed by the stranger, the character of those predispositions to disease the

developement of which the climate prevents, the diseases whose symptoms are suited to, and those which are altogether unfitted for the climate.

In his general descriptions the Author will confine himself to such matters as may be necessary and interesting for an invalid to know, and any opinions he may give will be deductions from statistic facts, or from sources of information on which he can depend, and from personal experience. He will indulge in no rash speculations. His readers will generally have an opportunity of judging for themselves; as the facts upon which he forms his own judgment will be open to them.

In one branch of the subject of this work, there is indeed no deficiency of facts,—namely, that which relates to the mineral waters of the Pyrénées and their therapeutic action on disease; but few and ill defined are the philosophic landmarks to guide the inquirer through this *rudis indigestaque moles*.

Although the thermal establishments of France are under the strict control of government inspectors, physicians of repute, and although thousands* annually resort to them for the cure of almost every ailment to which “flesh is heir,” yet the principles which regulate the exhibition of their

* Some thirty years ago, the number of visitors to the French mineral watering places amounted to 30,000; at the present day, they amount to 100,000.

respective waters are still very deficient in precision; a consequence of which has been, that where cases have been indiscriminately submitted to their influence, many have derived great benefit, while the diseases of others have been fatally aggravated by their use.

That this state of things must continue is evident, so long as invalids are to constitute themselves the judges in their own case, and are permitted without proper surveillance to take the waters. At the German spas no person is allowed to drink the waters, or even to take a bath, until the inspector has, upon examination, ascertained that his malady is likely to be benefited by their use.

CHAPTER II.

HINTS TO INVALIDS ABOUT TO LEAVE ENGLAND FOR PAU. PYRENEES. GENERAL REMARKS ON THE LOCALITY AND SCENERY OF PAU. LOCAL DETAILS. PROMENADES. OBJECTS OF INTEREST.

BEFORE entering into those details respecting Pau as a residence with which strangers, no doubt, would wish to be made acquainted, it may not be undesirable to point out to the invalid the easiest mode of making the journey, and to mention some precautions which it will be advantageous for him to observe.

Should the parties make London the starting-point, the most expeditious route is by railroad to Southampton, thence to Havre by steam, from which place steamers at present ply to Bordeaux, on the 1st, 10th, and 20th of every month. The voyage from Southampton to Havre is made in twelve to sixteen hours, that from Havre to Bordeaux in fifty-five to sixty-five hours. As there is, however, some doubt as to whether these steamers will continue to run, there is another route by steam, viz. from Southampton to St. Malo, thence by a short land journey to Nantes, from which place there are steamers to Bordeaux, on the 1st, 11th, and 22nd of each month. The journey is thus performed in four or five days without much fatigue,

which, if made by land, would occupy ten or twelve days.

Even in a remedial point of view, the diseases, for the treatment of which the climate of Pau is most adapted, frequently receive marked benefit from a sea voyage, and the fatigue of a long land journey, accumulating irritation upon the invalid, is avoided.

The distance from Bordeaux to Pau, being only 125 miles, may be performed with great ease in two or three days, even by the most delicate person.

The conveniences of railroad and steam bring, at the present day, the invalid nearer to Pau than he formerly was to the coast of Devonshire and Cornwall; for much less fatigue and irritation are now induced during a longer journey in search of a more decided climate.

The journey should not be undertaken later than the 1st of September by those who wish to pass the winter at Pau; for, independently of the atmospheric changes which take place in England after this period of the year, and to avoid which must be a paramount object, it will also be necessary to anticipate the season of the equinoctial gales, which occur towards the second and third weeks of September.

And before leaving England, let not the healthy or unhealthy suppose, that, because they are going to the south of France, they are about to settle in a land of unbroken sunshine, where precautions as to dress and exposure to the atmosphere are un-

necessary. This matter will be dwelt upon more fully in the sequel; at present, it is recommended that every one come well supplied with articles of warm clothing, and above all with flannel, which ought to be worn next the skin by all. Armed with these precautions, one main drawback to southern climates, viz., the great difference of temperature that exists between the sun and the shade during the winter and spring, will in a great degree be met, if not neutralized, and a gentle moisture encouraged on the surface of the body, so conducive to health in all countries and climates.

And should the object of the person's visit to Pau be for the alleviation or cure of any of those morbid affections suitable to its climate or to the mineral waters of the Pyrénées, it will be desirable that the patient have a well-detailed statement of his case drawn up by his medical attendant. It will not only be a guide at the time, but a point to look back upon by which to judge, at a more distant day, of the effects produced by change of climate and other circumstances.

The advantage of an early arrival in Pau will be felt in affording to the stranger a better choice of lodging. It is a matter of great importance to persons, for instance, with inflammatory irritation of the air passages and analogous affections of the pulmonary apparatus, that they should procure apartments with a southern aspect, at least with some of

the rooms having this exposure; and as all have not this advantage, houses, so favourably situated, are very soon engaged. Of late years, Pau has become a place of resort for Parisian invalids of rank, so that there is less choice, at a late period of the year, than formerly.

The two principal routes, by which the traveller approaches Pau, are either on the east, from Italy, by Toulouse; or from the north by the way of Bordeaux. The Pyrénées, by the former road, are visible from a great distance, and perhaps the most extensive view is obtained from the neighbourhood of Toulouse, which is situated nearly opposite to the centre of the chain. Here the eye takes in the whole range, commencing with the most prominent points in the eastern extremity of the mountains, and the principal peaks in the Hautes and Basses Pyrénées as they approach the Atlantic. On the north also, as we approach Pau, we have an opportunity of seeing from afar the effect of a sixty miles' continuation of these mountains in the back ground, varying their aspect and expression by infinite and indescribable shades, according to the distance, the state of the atmosphere, and the period of the day.

As we come still nearer to Pau, “on reaching the top of the hill, an unrivalled scene bursts upon our view. Immediately below is a broad plain, or rather valley, with a little world of its own within its bosom —villages and hamlets, and vineyards, and streams,

rich in fertility, and lighted up with sunshine—all peaceful, and sweet, and gentle, while directly behind the hill that bounds it on the other side, rises the vast line of the Pyrénées in all Nature's grandest and most magnificent forms. It is impossible to describe the effect that such mountain scenery possesses; one gasps, as it were, to take it all in. After contemplating for any length of time those immense works of Nature, if we turn to look at the dwellings of man, which seem crouching themselves at the feet of their lofty neighbours, the lord of the creation dwindles to an insect, and the proudest of his palaces looks like the refuge of a caterpillar*."

Pau, the capital of the ancient province of Bearn, and now the chief city of the Department of the Basses Pyrénées, is situated about one hundred and twenty-five miles south of Bordeaux, and about seventy miles east of Bayonne, on the Gulf of Gascony.

The theatre for ages of the most stirring events in the history of France and Spain, where the chivalry of its princes, on the one hand, guarded its territories from foreign yoke, and the enlightened fidelity of its people, on the other, organized the earliest specimen of legislative government, and boldly fought for the liberties they enjoyed,—Bearn, at the present day, though long incorporated with

* JAMES's *Desultory Man.*

France, still claims for its population a degree of social, moral, and physical superiority, equal to, and in some respects surpassing, the most favoured districts of the kingdom.

Pau, which is about twenty miles distant from the nearest part of the Pyrenean chains, commands from all its promenades, and from the houses built on the edge of the terrace on which it stands, a view of the mountains to the extent of at least sixty miles. From these points some of the loftiest peaks may be seen; among others, the Pic du Midi de Bigorre, forming a promontory to the east; and the glaciers of the Neouville and the Vignemale sparkling in the beams of the noon-day sun, or glowing with roseate tints brought out by his setting rays. Directly in front of Pau, at a distance of from twenty-five to thirty miles, the Pic de Gers, the mountains surrounding the Eaux-Bonnes and Eaux-Chaudes, and the mitred Pic du Midi d'Ossau, the most uniquely grand of all the Pyrenees, stand out in bold and individual relief; while in a clear sky the ever varying lights, falling with eccentric playfulness upon the whole mass, now elevate them, in appearance, to a mysterious height, now sink them into insignificance. Shortly, a dissecting light falls strongly upon the chains, which seemed before a hard dry line, dis severing mass from mass, at an elevation of 8,000 to 10,000 feet, through an undulating gradation, until they terminate in the smiling

Côteaux of Turançon and Gelos, only 300 feet high, forming a luxuriant façade in the foreground, at half a mile distance from Pau, with the river rolling on between.

The object of this work is not to describe scenery: yet how difficult it is to desist; and fortunate it is for the Author that it does not enter into his plan, since he feels that no language of his can describe Nature in its beauty and grandeur,—such beauty and such grandeur as meet even the dullest eye at every outlet of Pau. Can there be anything in this world, as to scenery, more beautiful, or majestic, than the panorama which greets the spectator from the Place Royale as he looks up the valley of the Gave towards the Pic de Bagnères, taking in the wooded headland of Narcastet on the one hand, and the Château of Bisanos on the other? What an unfading reminiscence for those who have visited Pau! Who that has once seen it can forget it?

The town, which contains nearly 14,000 inhabitants, is well built, and many of the old houses bespeak the style in which their ancient owners must have lived, ere great political changes altered the relations of society. Formerly, a century ago or more, although the royal court had long departed from Bearn, its aristocracy, eminent from long descent and their patriarchal virtues, kept up much state and hospitality. But their mansions are now tenanted by strangers, and many of the oldest families live

but in history. Still, there *are* families who have outlived stormy times, and whose graciousness of manner, and the happy tact of placing the stranger at once at his ease and on good terms with himself, point out the good stock whence they have sprung. Nor is this confined to any one class. From the highest to the lowest of the native population, politeness and good nature prevail. It is a virtue inherent in them. It is a happy remnant of the original patriarchal state, which one finds throughout the Vascongada provinces of Spain and the adjacent Basque country.

Taking other towns in France of the same population and importance as a rule, Pau ranks tolerably high as to the state of its streets, the commodiousness of its houses, and the convenience of voitures, &c., which are almost indispensable to the English stranger. Twenty years ago there was not a house with a carpet, not a carriage to be hired*, nor, with one exception, a private carriage in the town ; the houses were deficient in all that which we mean by the word *comfort*; and until very lately there was not a *trottoir* in any of the streets. Now, the houses are, to a certain extent, furnished according to

* Some twenty years ago, a lady, who still resides in Pau, begged the owner of her apartment to procure a carriage to take herself and family to a soirée at the Préfecture. At the appointed time, a *diligence*, with four horses, arrived, being the only conveyance the town afforded.

English wants and views of convenience; carriages are to be had in abundance at a moderate charge; and every year improvements are taking place, to render Pau more agreeable as a residence. Each street can boast of broken lines of foot pavement, and in a very short time the example will be generally adopted.

The town extends from east to west, and may be said to have three parallel streets. It is built upon a terrace which overlooks the river, at an elevation of 150 feet, and consequently faces the Pyrénées, and is protected on the north by the *Landes* of the Pont Long, which ascend very gradually to the distance of fifteen miles from Pau. The north wind is thus directed into currents, which, being attracted by the lofty mountains to the south, pass at an elevation considerably above the town: so that the clouds may be often seen quietly sailing, onwards, when the leaves are unmoved on the lower level. From the west,—the point from which the wind not unfrequently blows,—the well-wooded park, a continuation of the terrace, taking a curved direction, forms at the distance of a mile a species of headland. This latter makes a linear intersection with the amphitheatre formed by the Côteaux of Turançon, which embraces Pau to the south and south-west, and screens it and its environs from the worst consequences of the only bad-weather quarter,—the west and north-west. The east and south-east winds and

their combinations are scarcely felt, except in bringing dry and warm weather. So thus, Pau frequently, one might say almost generally, enjoys a stillness of atmosphere so complete, as to leave a doubt as to how the wind really blows. So much is this the case, that it is said of a certain naval captain, who had buffeted many a breeze, that he left Pau in disgust, because, during the two or three years he had lived there, he had never once encountered, in nautical phraseology, "*a capful of wind.*"

Mr. Inglis* thus cursorily describes Pau. "It has always enjoyed the reputation of being one of the most interesting cities of the south of France; and altogether I think it deserves its reputation. It lies in one of the most beautiful and most abundant countries of Europe, in one of the finest climates, and the city itself is clean, airy, and abounds in every convenience, and in most luxuries. As for the environs of Pau, they are certainly beautiful. The Gave serpentines through the charming undulating country that surrounds the town. Grain, meadows, and vines, diversify the scenery, and innumerable country-houses are everywhere scattered around. Nothing can exceed the beauty of the promenades in the neighbourhood of Pau. Some lie along the side of the Gave, others along the banks of the

* *Switzerland, the South of France, and the Pyrénées, in 1830,*
by H. D. INGLIS; p. 220. Constable's edition.

smaller river, and within the town there is a large and shaded platform which commands a magnificent view over the surrounding country. Pau is a great resort for strangers, and I should think the most desirable of any of the towns which are selected by foreigners as a residence."

The Pau season may be said to commence on the 1st of September, and to continue till the 1st of June. This arrangement, of course, is dependent upon two circumstances ; 1st. The state of the weather both at the usual commencement and close of the season ; 2dly, The objects which the visitors have in view ; and 3dly., The necessities arising out of their state of health. According to the usual average of the weather, it is not safe for invalids to remain in the higher regions of the Pyrénées after the commencement of September ; nor is the atmosphere always sufficiently settled before the 1st of June, and occasionally not for some weeks afterwards, for a salutary sojourn at Barréges, Cauterets, or even Eaux-Bonnes or Eaux-Chaudes. The summer heat scarcely sets in with intensity at Pau, before the middle or end of June ; and there is nothing more to be guarded against by the invalid, anxious to escape from the sameness of Pau's sedative atmosphere, than to be seduced to take up his mountain quarters too soon.

By making early application for apartments, there is sufficient choice to suit the wants of either

large or small families. There are in Pau and its neighbourhood at least 100 *suit s* of apartments, more or less well furnished, independently of small lodgings and the hotels. The average rent of two-thirds of this number may be stated at from 2500 to 3500 francs for eight or nine months; the remainder vary from 1200 to 2500 francs for the same period. Some of the apartments have accommodation for twelve to fifteen persons, and all the larger ones would contain six or eight people or more. The houses are furnished with every thing necessary for a family, except linen and plate, both of which may be hired in the town. Those who may prefer living out of town have an opportunity of gratifying their tastes, as there are several comfortable houses to be let, in healthy and airy situations, at distances varying from half a mile to two miles.

In the town the houses are for the most part let out in apartments, so that there may be two or more families under the same röof; but in the event of any family requiring more extensive accommodation, or preferring an entire house, it is a matter easy of arrangement.

There are lodgings to be had at the hotels, either for families or single persons; by the latter, at a very moderate rate in private houses, and a bachelor may *abonner* himself in any of the hotels for a small monthly charge. The best hotels are the Hôtel de l'Europe, Hôtel de France, Hôtel de la Poste, and

Hôtel des Ambassadeurs. At all these hotels they are well acquainted with the habits and tastes of the English, and are very anxious to anticipate their wishes, and consult their comfort in every way. Those who prefer to be served by *restaurants*, in preference to a *cuisine* at home, can be gratified at a moderate expense either à *l'Anglaise*, or à *la Française*.

The wages of French servants are not exorbitant; a good cook may be hired for fifteen or twenty-five francs a month; a man servant for thirty to thirty-five francs. Voitures in abundance are to be had by the month, day, or hour at a moderate rate, say 1*s.* 8*d.* an hour, and the charge for saddle-horses is 2*s.* a day. The prices of the substantial articles of living are one-half of what they are in England, and even English luxuries cost very little more than in England.

An English place of worship has been recently erected at a cost of upwards of 40,000 francs, where service is performed on Sundays, twice in English and twice in French. The church owes its origin to the munificence of the Duchess of Gordon, who purchased the site five years ago, and has since considerably contributed to its funds. The remainder of the expense of erection has been subscribed by English residents and visitors, among whom we ought not to omit Lord Newark, who has given several thousand francs towards its completion. The

office of English chaplain is at present filled by the Rev. Edward Hedges, appointed by the Bishop of London; and that of French pastor by the Rev. Leonard Buscarlet.

It may be proper to make known to those desirous of coming to Pau with children, that good masters are to be found for all the branches of education usually taught. There are experienced teachers of the French and Spanish languages, and classics, and professors capable of instructing in the more advanced parts of music, drawing, and other polite accomplishments.

There is also the Royal College, where the classics, mathematics, and philosophy are taught. The boys may be boarded at the College, which is under a good system of discipline, great attention being paid to the health of the pupils. Although a Catholic institution, no tampering is permitted or practised with the religious opinions of the pupils, a Protestant clergyman regularly visiting the college, and examining the boys who are of that persuasion, while every Sunday they are regularly conducted to the Protestant church.

The public library, belonging to the municipality, containing fifteen thousand volumes, upon all the varied subjects of art, science, theology, and history, is open the greatest part of the day; and every facility is given to those who may wish to consult any of the books.

With regard to public amusements Pau is confessedly deficient. Although there is a theatre, still it is not at all in character with the importance of the town; but a race-course is being prepared on the plain of Bilhères adjoining the town, where, for the first time, annual races will take place during the month of August, under the auspices of the government.

But to those who prefer rational gaiety and amusement, the private *soirées* during the winter months fill up the public void, and leave little else to be desired. Here one meets with agreeable and accomplished people, and the time of those who have sufficiently good health to visit in the evening, or whose tastes lead them in that direction, never hangs heavily on hand. There is in Pau varieties of society to please the grave and the gay, and all are agreeable in their way.

Some years ago an English club was established, where the London Journals and leading periodicals were taken, which formed an agreeable centre of attraction and bond of union among our countrymen. It numbered in 1838-39, fifty-five members; but it has since been allowed to fall to the ground. It is proposed, however, to revive it during the ensuing winter, and to infuse into it some principle of permanency.

There is a custom which has prevailed in Pau, until it has become law, that the last comer calls

upon those who have arrived before him, if he wishes to make himself acquainted with the society. It is so opposite to the rule in England, that the information is not always very palatable to the retiring sensitiveness of the English character; but on reflection, the custom will be found to have had some good reasons for its original adoption, and for its present continuance. In the first place, it gives the stranger an absolute advantage over the older resident; he may, from sickness in his family, wish to remain isolated; or he may desire to make the acquaintance of those of congenial tastes; or to modify his circle according to his views. If again, he desire to enter more generally into society, the path is sufficiently smoothed to make it easy. The custom gives the stranger a breathing-time, in which he can look around him, and choose the people and plan most suitable to the arrangements to which he intends to adhere.

The facilities for taking air and exercise at Pau, either in a carriage, on horseback, or on foot, are abundant. Five principal highways, kept in excellent repair, radiate from Pau, and command views, not only of the Pyrénées, but also of the tamer but still beautiful scenery of the plains. On horseback, rides may be varied to any extent, among the undulating and well-wooded *coteaux* to the south; while the pedestrian, if in good health, may make many pilgrimages through green lanes and

clustering vineyards ; and although much cannot be said of a field for the sportsman's pursuits, still there is sufficient to act as an incentive to take air and exercise. At the early part of the season, after the corn has been housed, at some five or six miles round Pau, the quail and partridge, particularly the former, may be found in sufficient quantity to afford sport; and during the winter months, woodcocks, snipes, and wild ducks, at no great distance from Pau. There is another sport of a more exhilarating and manly kind, viz., that of hunting the izzard and the bear in their native fastnesses on the mountains, and searching for the *coq de bruyère* (the capercailzie of Scotland) amidst the black pines on the summits of lofty peaks ; but a description of these sports we shall reserve to the sequel, when we come to speak of the Pyrénées themselves. In the valley of Tarbes, twenty-four miles to the east of Pau, a baronet keeps a pack of English hounds, which meet four times a week during the season. The foxes are so abundant that the sportsmen are never without a *find*; and the runs are described as excellent, the country being well suited for the sport. The worthy baronet, who is himself passionately fond of the chase, is very polite to his countrymen, who, like himself, possess a genuine love for it.

The principal promenade is the Park, a terrace extending a mile, overlooking the river, and well wooded, and one which is almost always practicable

by lady promenaders, if three hours of sunshine succeed thirty-six hours of rain. Its soil is so absorbent, and the atmospheric properties of Pau so peculiar, that in this short space of time, the principal walks, even during the winter months, become dry.

Mrs. Ellis*, in speaking of the Parc, thus describes it :—“ Impatient to become acquainted with a place where we expected to spend some months, I took the earliest opportunity of quitting the hotel, and following the tide (of promenaders) I had observed, soon found myself at the entrance of a spacious and noble avenue of trees, leading to a promenade, which is justly celebrated as being one of the most beautiful in the world. It is called the Parc, and consists of a range of high ground, running from east to west, parallel with the river Gave, thickly covered with magnificent trees, chiefly beech, and laid out in walks of every variety, some straight and others serpentine, some leading along the highest ridges and commanding the most extensive views, while others wind along the foot of the eminence, beneath the shadow of the loftier trees, and others still narrower and more intricate are nearly lost among thicker foliage and closer underwood, as if to suit the different tastes and dispositions of the many strangers from distant lands, who meet here to enjoy

* *Summer and Winter in the Pyrénées*, pp. 32, 33.

the luxury of this delicious climate,"—"and a motley concourse there are ; invalids of every stage, from mere delicacy down to helpless disease, are seen basking in the sunshine, or leaning on the arms that would be stretched forth, if it were possible, to snatch them from the grave."—" Yet on the other hand, it is a spectacle which scarcely can be contemplated without feelings of gratitude and joy, to think that there is such an atmosphere and such a scene accessible to so many of the inhabitants of less genial climates, and that the health and vigour of which so many are in search, so often are restored to them beneath these sunny skies."

As the view from the Parc combines, in one harmonious whole, all the elements which constitute a perfect *coup d'œil* of beauty and grandeur : and as the description in the *Desultory Man*, contains much spirit, without exaggeration, it is here quoted. "The highest walk, extending for nearly a mile, commands a most beautiful and ever-changing view of the mountains, while lie pile above pile stretched along the whole extent of the southern sky. Indeed they form a scene of enchantment, and are never for a moment the same, sometimes so involved in mist, that they form but a faint blue back-ground to the nearest hills, sometimes so distinct, that one might fancy that he saw the izzard bounding from rock to rock. The course of the sun, also, alters

them entirely by the difference of the shadows ; and the clouds frequently rolled in white masses, half way down their peaks, give them an appearance of much greater height than when they stand out in the plain blue sky. But, however they may appear, even at the times they are clearest, there is still that kind of airy uncertainty about them which makes one scarcely think them real. They seem the bright delusion of some fairy dream ; and, indeed, I was almost inclined to think it a deception, when on waking, the third morning after my arrival, I looked for the mountains, and found that like Aladdin's palace, they were gone, not a vestige of them remaining—not a trace where they had been. The sky, indeed, was cloudy, but the day otherwise fair, and to any one unaccustomed to mountain scenery, it would appear impossible, that any clouds could hide objects, at other times seen so near. But so it was ; for two days we saw nothing of them ; and then again the curtain of clouds rose majestically from before them, and left the whole as clear and as grand as ever."

The chief object of interest in Pau, after its scenery, is its *château*, a fine old building mingling the military architecture of the thirteenth with that of the three succeeding centuries, and viewed with great veneration by the Bearnais, as the birth-place of their beloved Henri Quatre. The chamber in which he first saw the light is still preserved, although

very lately modernized ; and a large tortoise-shell, his cradle, is exhibited under a satin and gold canopy, with armorial supporters. His present Majesty, Louis Philippe, has expended large sums on the restoration of this, the first abode of the common ancestor of the Bourbons. Furniture of the epoch of Henry, or as near to it as possible, has been selected by antiquarians.

The following anecdote, while it shews the attachment which the Bearnois entertained for the memory of Henri, displays considerable tact in the manner of getting out of a difficulty. Being desirous to erect a statue to his honour, they requested permission of the Ministers of Louis XV. to carry their wishes into execution. They received for answer, that as they had money to spend for such purposes, it would be more becoming to devote it in honour of the reigning sovereign. Feeling it impossible to resist so strong a hint, they raised the required statue, but placed on it the following inscription, which carries a little quiet satire with it.

“A Louis XV., petit-fils du bon Henri.”

This statue shared the fate of all the other works of the same nature, in honour of the Bourbons, from the blind fury of the first revolutionists.

All reminiscences of Henri are treasured by the natives with great pride and devotion, and from their historical interest, are objects of curiosity to strangers.

A mile from Pau, the house where he was nursed still exists in the village of Bilhères; and many legends are cherished of his feats in love, ere those in war supplied so important a page to the history of Europe.

From this birth-place of one great monarch a three minutes' walk brings us to the house where another was born, the present King of Sweden. It is a small two-storied house, but an interest belongs to it attaching to few palaces.

The state of prosperity and of national and individual happiness to which the King of Sweden has raised his people, fully testify how fortunate they were in the choice of their monarch, while their appreciation of his virtues is no less conspicuous. Mr. Rae Wilson, the well-known traveller, informed the Author that he made a point of ascertaining the sentiments of all classes towards their king; and that in the remotest hamlet, as in the palace of the noble, the feeling was one not merely of pure loyalty, but of the warmest affection. His Majesty takes still a lively interest in everything connected with the welfare of Bearn and the Bearnois.

There are different objects of antiquarian interest within the compass of a morning's ride from Pau, which will well repay the person making it. An excursion always possesses greater interest, and is even more conducive to health, if it has an object.

We may briefly instance the church of Sainte Foi, at Morlaas, six miles to the north-east; the church and town of Lescar, four miles to the west, with its monuments of kings and renowned characters of history; the Maison Carrée, at Nay, nine miles distant, in the direction of the Pyrénées; and a little further on, the château of Coaraze, where Henri Quatre spent his boyhood, educated like the hardiest peasant.

The ride to *La Pietad* over the *coteaux* of Gelos is one full of striking scenery. Indeed, mounted on the quiet sure-footed ponies of the country, the rides may safely be varied in all directions, either in search of healthy exercise or picturesque situations, each hundred yards of progress revealing fresh combinations of smiling beauty and majestic grandeur. "Through every opening, from every height, the mountains, shadowy or pronounced, are visible, unless it be when the clouds drop low, and then the rich and lovely *coteaux* have it all to themselves, and make another kind of country of it; peaks and eagles vanish, and vines, ploughshares, woods, and woodlarks, the thrush, the linnet, and the hawthorn bush, come into play. I have never seen a country more beautifully ridged; one wooded line runs parallel with another, not stiffly, but in soft and graceful undulations; a third and higher one stretches off beyond; valley after valley lies behind them, full of silence, shade, and freshness; and as

there are literally no bad bits here, every country house has at least a fine position, usually a pleasant country character, and often woods and lawns that we love to liken to our own of England*."

* *Sketches in the Pyrénées*, vol. i., p. 213.

CHAPTER III.

SOME METEOROLOGICAL DETAILS CONNECTED WITH THE CLIMATE
OF PAU. METEOROLOGICAL TABLES FOR SEVERAL SUCCEED-
ING YEARS.

ANY person who has had experience in the treatment of disease, and who has seen similar diseases in similar temperaments, under different geographical conditions, must confess that the beneficial effects of any one climate over another, are not always in unison with *à priori* conclusions drawn from facts indicated by the usual philosophical instruments. Still, if not always unerring guides, these indications at least help us on the road, and where they are deficient in accounting for the results, they lead us in search of auxiliary causes, and thus enable us to arrive at some knowledge of the peculiarities of climate, and their influence upon the human frame.

We find many anomalies connected with climate, independently of its degree of latitude, which influence its temperature and its degree of humidity, such as the shape of the countries in which the different districts may lie, the position of a hill favourably situated, as a shield from the bad-weather-quarter, or the reverse, and other circumstances not readily observable as causes, but fully appreciable in their

results. Thus Middlebourg, which is a degree further south than Amsterdam, ought to have a mean higher temperature of 2° , whereas it is 4° lower. The town of Brussels has not its mean temperature so high as Amsterdam, although it is a degree and a half more to the south. Marseilles is more than a degree to the south of Genoa: the mean temperature of the latter ought then to be one degree less than that of the former, but it is, on the contrary, two degrees higher. It would not be surprising that Marseilles should have a climate warmer than Avignon, which is situated more to the north, and in the interior, and that the winters should be here less cold and the summers less hot: but what is the cause which renders the mean temperature of Marseilles lower than that of Avignon? Rome and Perpignan have exactly the same mean temperature, although Rome is a degree more to the south. It may be given as a reason that Rome is influenced by the Apennines, but Perpignan is at the foot of the Pyrénées*.

It is not merely a climate possessing a high thermometric and barometric standard, which can or does afford a *panacea* for all those diseases, for the relief of which, people fly from cold and moist countries. The varieties of atmosphere are so different, from local circumstances, in different places in the same

* *Annuaire du Bureau des Longitudes* for 1834.

latitudes, that an intimate knowledge of the peculiar details, as they operate beneficially or otherwise, is required, in conjunction with general meteorological *data*, to fix a rule as to the medical fitness of any climate as a remedy, and thus experience comes in aid of philosophy.

For instance, we shall have a higher degree of temperature marked by the thermometer in one country; yet it shall feel colder to the sense, and the body shall actually be robbed of more animal warmth, than in another where the temperature is some degrees lower. The prevalence of certain winds, blowing with unmodified force, far more than injuriously overbalance the benefits of a higher temperature, in its effects upon the human frame; while certain electric states of the atmosphere add, at one time, fuel to diseases depending upon mixed nervous and inflammatory irritation; and at another, tend very materially to improve the type of maladies connected with atonic and cachectic temperaments, and thus confound our usual reasonings from barometrical indications.

Thus at Nice, where, during the spring months the temperature is $2\frac{1}{4}^{\circ}$ higher than Pau, the healthy and unhealthy feel, to use their own expression, cut into two by the mistral, which blows over Provence from the north-west, and still more so from the easterly winds that begin in March and continue to the end of April. At Rome, again, where the tempera-

ture is 3° higher than at Pau, the tramontana blows with a severity almost equalling the mistral; while at the same season in Pau the weather is mild and sedative, from the almost total absence of wind, and from other atmospheric circumstances peculiar to the climate.

We may also observe that the quantity of rain indicated by the udometer, as having fallen in any one place, does not necessarily determine the character of its climate as to humidity. This is remarkably the case with Pau, where the rain-gauge and the hygrometer are much at variance, not only absolutely in so far as Pau is concerned, but relatively to other places. For instance, last summer, when great quantities of rain fell in the south-west of France, as well as over great part of Europe, the hygrometer at Pau did not show a high range of scale, varying from 70 to 85° ; while at Bagnères-en-Bigorre, thirty-six miles from Pau, further from the sea, and consequently from the bad-weather-quarter, it showed an almost permanent range of 20° to 25° higher on the same scale.

There are some circumstances although familiar, which we shall give, as illustrating the peculiar absence of *free communicable humidity* in the atmosphere at Pau. Although considerably more rain falls in Pau than in London and in some other situations in England, yet from the absorbent nature of the soil, and from some peculiar electric state of

the atmosphere (for the barometer, during some of the winter and spring months, most strangely rises on the approach of rain, and falls upon that of dry weather), the ladies, even during a continuance of rainy weather, find that their hair, living hygrometers highly sensitive to an overcharged state of the atmosphere, retains the curl much better than in England. Indeed, so much is this the case, that some who in England were obliged to wear the hair *en bandeaux*, find that it now curls without effort. Another familiar proof of the deficiency of free moisture in the atmosphere, may be given, viz., that steel articles of furniture are found little affected with rust even in unoccupied houses, nor do the walls of the latter show marks of damp.

A French gentleman, proprietor of a country house on the Coteaux of Gelos, which had been occupied by Lord Falkland and family, exposed in all directions to the weather, informed the Author, that in this house, where no fires had been kept for two years, there was not the least appearance of mildew observable on the paper or furniture; and that on opening the windows from time to time, at long intervals, to air the apartments, the flies were found alive and active.

Yet although a considerable quantity of rain falls in Pau, compared with London and other localities, still the number of rainy days is much fewer than in many other places. Thus, for instance, 27 inches

of rain fall annually in London, and from 36 to 40 inches or more in Pau, but the number of rainy days is, according to Sir James Clark, 109 at the latter place*, and 178 in London. The rains in Pau and neighbourhood fall in large and sudden quantities, and frequently towards and after the setting of the sun, and the soil is so absorbent, and the natural drainage so good, that there are few days in which the healthy may not pass three or four hours in the open air, and on which even the invalid, well clothed, may not generally take exercise in the middle of the day.

By reference to Table No. III, at the end of this chapter, it will be seen that the mean temperature of the autumn, winter, and spring seasons, have been taken from thermometric indications observed three times a-day: viz., 9 o'clock A.M., 1 o'clock P.M., and 5 o'clock P.M.; that for autumn being 62° , for winter 45° , and for spring 58° . This calculation has been made with the view of showing the invalid the mean state of the temperature for the different seasons, at that period of the twenty-four hours when he is most likely to expose himself to the external air. This mild state of the temperature, combined with an almost entire absence of wind at all seasons, supplies every quality of climate where functional repose in

* This average is given from observations made in the years 1822-24. It will be seen from the tables in this work, that the average is higher.

excitable temperaments is the object sought for. Indeed, during the winters of 1838-39, and 40-41, invalids, with chest affections, were seen sitting in the open air during the months of November, December, and January, without injury.

The west wind, which brings rain, does not bring cold with it. Indeed, it has been universally remarked, not only by medical men, but confirmed by the consoling experience of persons suffering from coughs depending on tuberculous or acute bronchitic irritation, that what is called bad weather, viz., cloudy and rainy weather, alleviates their symptoms. This is clearly enough visible in the diminished pulse, lessened cough, and increased feelings of *bien-être*. The best wind is the south-west, as the same good qualities of weather are found as in the west, without the inconvenience of rain.

The discrepancy between the indications of the udometer and hygrometer, already remarked upon, as well as the anomaly observed in the barometer during certain months of the year, rising before wet weather, and sinking on the approach of dry weather, may perhaps be traceable to the changes which suddenly take place in the winds, these being frequently in the morning from the east, in the forenoon and middle of the day from the south, and veering to the south-west and west towards its close. When the wind has been for a short time in the south-east and south, the air becomes charged with electric

matter to a greater or less extent, but always to a degree appreciable by persons of a sanguine temperament. The wind in this state of things changing to the west, which is the invariable result, brings on its soft and soothing wings volumes of Atlantic vapour, to be expended in the absorption of the excess of atmospheric electricity; thus not merely robbing the air of its exciting and irritating properties, but lulling the system at the same time. In addition to this, the soil of Pau, being gravelly, instantly absorbs any amount of moisture. And the valley of the Gave, with a similar soil, extending so many miles, has a fall in all directions to the river; so that there is no accumulation of standing water to be re-absorbed into the atmosphere.

Sir James Clark makes the following general observations on the climate of Pau* :—“The annual quantity of rain has not been measured at Pau. The number of days in which rain falls is 109, nearly the same as at Rome, and about 70 less than in London. The west wind blowing directly from the Atlantic, is accompanied with rain; the wind from the north-west and from this point to the north-east, brings dry cold weather. The south and south-west winds are warm and oppressive. The westerly or Atlantic winds are the most prevalent; the north wind blows feebly and is not frequent; the oppressive southerly

* CLARK, *on Climate*, 190.

winds are of rare occurrence and seldom continue longer than twenty-four hours. Indeed Pau appears almost exempt from the oppressive southerly winds on the one hand, and the cold north-west winds on the other, both of which prevail over this part of France generally.

"The easterly winds are next in frequency to the west, with which they usually alternate; and it is observed, that according as the one or other wind prevails, the weather is rainy or dry and pleasant.

"Rain seldom continues above two days at a time, and is usually followed, in a few hours, by warm sunshine, while the ground, from the absorbent nature of the soil, dries rapidly. The atmosphere, generally speaking, is also remarkably free from moisture, as indicated by the hygrometer. In October some snow generally falls on the centre chain of the Pyrénées; and at Pau this fall is marked by a sudden change of temperature, the weather becoming rainy and chilly. In November the weather clears up, and becomes milder. December and January are cold and dry; frost and slight snow-showers then occur, but the snow does not lie upon the ground. The sun is bright and warm, and from twelve till three o'clock an invalid may generally take exercise. February is milder, but towards the end of this month the spring rains fall, and the weather is then chilly and disagreeable. March is mild but variable, though there are no cutting winds. In

spring westerly winds, which are soft and mild, accompanied with rain, alternate with dry easterly winds also of a mild character. Hence it is that the vernal exacerbation of inflammatory affections of the stomach and lungs so commonly observed in other climates, is little felt by invalids at Pau.

"There are several circumstances in the climate Pau which render it a favourable residence for a certain class of invalids. The atmosphere, when it does not rain, is dry, and the weather fine, and there are neither fogs nor piercing winds. The characteristic quality of the climate, however, is the comparative mildness of the spring and exemption from cold winds.

"The mildness of the spring and its little liability to winds, render this place favourable in chronic affections of the larynx, trachea, and bronchi. In gastritic dyspepsia, Dr. Playfair has found it beneficial, and he has seen it useful in a few cases of asthma. With delicate children also he found the climate agree well, especially when they removed to the mountains during the summer."

Mr. Murray*, although no medical authority, thus conveys his notions of the climate of Pau, from what he experienced:—"The climate of Pau is, perhaps, the most genial and best suited to invalids

* *A Summer in the Pyrénées*, by the Honourable JAMES ERSKINE MURRAY, vol. ii., p. 131.

of any other spot in France. There are there no sudden transitions from heat to cold as at Nice or Montpellier; nor piercing cold winters as at Tours; indeed the almost continued fine weather is only broken for three weeks or a month in the beginning of January, by the winter rains, accompanied by slight frost; but the snow is seldom visible a few hours after it falls; and the heats of its southern latitude are tempered by the vicinity of the mountains, in whose cool recesses those who feel the summer sun too oppressive, can in a very few hours take refuge."

Pau, from its local position is so sheltered, and indeed, from some atmospheric peculiarities of the climate, generally so free from the presence of wind, that scarcely at any season of the year is the function of any organ, however delicate, liable to be disturbed, provided proper attention be paid to clothing, and exposure to the sun's rays be avoided. Whatever quantity of rain may fall, or what cold may occur, there is no piercing wind as in Britain, or even in Nice, Florence, or Rome, to force its severity into the *penetralia* of weakened frames; nor externally does the atmosphere communicate to the feelings the sensation of rawness.

Mrs. Ellis*, in speaking of the atmosphere, remarks: "At the foot of a woody range of high

* *Summer and Winter in the Pyrénées*, p. 35.

ground, forming the promenade above described, (the Parc,) runs the broad shallow river Gave, with a perpetual low murmur that lulls the senses to repose. It is, in fact, the only sound we hear; for there is so little wind in this climate that not a leaf is seen to move, and we, therefore, distinguish at a greater distance the toll of the matin and vesper bell in the neighbouring villages, and the tinkling sounds which tell when the flocks are led to and from the fields. There appears at first to be a sort of mystery in this universal stillness. It seems like a pause in the breath of nature, a suspension of the general throb of life; and we almost feel as if it must be followed by that shout of joy which the language of poetry has so often described, as the grateful response of nature for the blessings of light and life; and never surely could this response be offered more appropriately than from such a scene as this rich and fertile land presents."

Again, on the same subject, says Sir James Clark*: "Calmness, for example, is a striking characteristic of the climate, high winds being of rare occurrence and short duration."

The effects of the genial south wind which, for an average of years, blows during the two first winter months, are very sensibly visible on the vegetation at Pau. On the Place Royale, an esplanade in the

* CLARK, *on the Sanative Influence of Climate*, p. 189.

centre of the town, which is freely exposed to the south, there is a sycamore-tree which, in the winter of 1840-41, displayed leaves an inch long on the 6th of January; and this winter of 1841-42, occasionally and unusually severe as the weather had been at its commencement, the Author, on the 12th of January, pointed out at least a dozen leaves, and the remaining branches bursting with buds.

It is not wished to convey, by the specimen just quoted, the idea that generation has begun to show itself at this early period of the year. With the exception of fruit-trees occasionally showing symptoms of life, under the influence of solar heat and a southern wind, this *avant-courier de printemps*, one of the advanced sentinels of the Place Royale, has its undivided glories to itself. It is not until the middle and end of March that the buds generally start into leaf, while the oaks put forth their leaves at least a month earlier than in England. Mrs. Ellis*, when speaking of this subject, says, that "from the beginning to the 25th of April, a great and rapid change comes over vegetation; the orchards suddenly become white with blossoms, lilacs burst forth into full bloom, and all things assume the same aspect they do with us about the end of May, or middle of June." On the 1st of March of this year, 1842, however, the poplars and

* *Summer and Winter in the Pyrénées*, p. 189.

willows were in leaf; and even the buds of the beech and the oak were considerably swollen.

While thus generally describing Pau, and its prevailing winds, and their influence upon vegetation, we shall give a few instances of the relative effects of the severe winter of 1838 upon Pau and some other places.

The cold which, in 1838, raged with such unusual severity in the different countries of Europe, was scarcely felt in Pau. It cannot be forgotten that when the temperature of Pau recalled the fine climate of Italy, at Orthez (only twenty-five miles distant to the west) a thick fall of snow covered the ground to Bayonne, (a further distance of forty miles). The cold at this time at St. Petersburg was 54° below the freezing point of Fahrenheit. At London, the cold, during the fire at the Royal Exchange, was so intense, that the water sent by the pumps against the burning buildings fell in icicles on the ground. At Brussels the cold was 5° of Fahrenheit during the night of the 16th and 17th of January. At Geneva, -4° or 36° below freezing, the greatest cold that had ever been there felt. At Paris 6°, where a soldier was frozen to death on duty in his sentry-box. At Rouen, the thermometer fell to 7°; at Caen, 2°; at Lyons, 2°; at Grenoble, 9°; at Toulouse, 2°. At Bordeaux, from the 10th to 20th of January, the thermometer had fallen gradually to 6°.

It may be stated as a general rule, almost without exception, that if at Pau there be weather more than usually severe, we in due time read in the journals the details of weather in England, and even in more southerly latitudes than Pau, far exceeding in severity and duration any met with here. While this is almost invariably true, it does not equally happen that severe weather elsewhere is countenanced by a corresponding deranged state of the weather in Pau. This is not merely the opinion of the Author, but is the result of the intelligent experience of the oldest British residents in the place.

Any one who paid attention to the atmospheric changes during the last winter of 1841-42, throughout Europe, must have been struck with their eccentric operation. While in the south of Europe the weather had been severe, for instance, at Barcelona, where, in the month of February, water used on the stage for melodramatic purposes was found to be frozen during the performances, in the north, for instance at Stockholm and St. Petersburg, the weather had been unusually mild. During the same month at Pau, the sun's rays were so powerful as to be oppressive, with vegetation threatening to burst into leaf. Indeed from the 30th of January to the 8th of March there had been weather something more than genial, with neither wind nor rain, if we except three occasions, when some rain fell during the night; while, at the same time,

in England there had been such frequent storms of wind and rain, as to create fears of a failure of the wheat-harvest in some districts. At Dublin there was a heavy fall of snow in the middle of February; and at Geneva the weather had been most unusually severe.

The following meteorological tables will give a tolerably accurate idea of the climate of Pau as regards its temperature, direction of the winds, number of rainy and snowy days, &c., &c., for a series of years. These tables may be depended on, as they are founded on observations furnished by M. Mermet, Professor of Natural Philosophy at the Royal College of Pau.

A table of barometric indications for the same series of years was made out for publication, but the information afforded by it would not have compensated for the trouble of putting it in type. Its range, during a considerable part of the year, was often inversely as to the state of the weather, taken in relation with the usual indications of the barometer to the weather in other and most usual circumstances, so that no index to be depended on could be formed from barometric tables founded on such *data*.

TABLE I.

Of the Mean Temperature of each month and year for the years 1837-38-39-40-41, and for the five years together.

MONTHS.	1837.	1838.	1839.	1840.	1841.	Mean of Five years.
January . . .	38	40	41	47	40	41·20
February . . .	47	43	46	41	41	43·60
March . . .	45	52	53	44	50	48·80
April . . .	49	50	56	52	52	51·80
May . . .	60	61	61	62	64	61·60
June . . .	72	67	68	71	63	68·20
July . . .	74	72	73	67	67	68·60
August . . .	75	76	74	73	69	73·40
September . .	67	67	66	66	71	68·50
October . . .	59	59	57	57	59	58·50
November . .	46	45	49	45	48	47·00
December . .	43	41	44	44	42	42·80
Mean tempera-ture for each of the five years . . .	56·25	56·8	57·33	56·58	55·50	
Mean tempera-ture for the whole five years						56·34

TABLE II.

Mean Temperature of the Seasons for the years 1837-38-39-40-41.

WINTER. viz.— December, January, February.	SPRING. viz.— March, April, May.	SUMMER. viz.— June, July, August.	AUTUMN. viz.— September, October, November.
42·53	54·06	70·06	58·00

TABLE III.

*Mean Temperature of the Winter and Spring Seasons for 1840-41,
and of the Autumn and Winter Seasons of 1841 and 1842, from
thermometric observations taken three times daily, viz. 9 o'clock
A. M., 1 o'clock P. M., and 5 o'clock P. M.*

1840-41.	1841.	1841.	1841-42.
WINTER. viz.— December, January, February.	SPRING. viz.— March, April, May.	AUTUMN. viz.— September, October, November.	WINTER. viz.— December, January, February.
44°31	58°24	62°12	46°30

TABLE IV.

*Number of Days in which some Rain fell during each month of each
year of the five years 1837-38-39-40-41.*

MONTHS.	1837.	1838.	1839.	1840.	1841.
	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.
January . . .	6	8	13	11	14
February . . .	11	12	11	10	7
March . . .	10	17	12	4	13
April . . .	19	17	10	12	11
May . . .	19	20	8	18	8
June . . .	7	13	5	13	8
July . . .	12	4	6	4	6
August . . .	8	6	3	7	3
September . . .	12	7	11	3	6
October . . .	7	7	12	11	17
November . .	14	22	15	14	11
December . .	4	8	10	9	15
Total . . .	129	141	116	116	119

If we add to these results for five years the number of rainy days in 1822-24, which amounted, according to Sir James Clark, to 109, we have an average for seven years of 119 days. The average quantity of rain that falls annually may be stated approximately at 42 inches. Thus, in the unusually wet year of 1838, when there were 141 days of rain, 44½ inches were shown to have fallen. In 1839 there were 116 days of rain, and the udometer showed 42 inches.

TABLE V.

Number of Days in which some Snow fell, and in which there was some Frost, in each month of each year 1837-38-39-40-41.

MONTHS.	1837.		1838.		1839.		1840.		1841.		TOTAL.	
	No. of Days.		No. of Days.		No. of Days.		No. of Days.		No. of Days.		No. of Days.	
	Show.	Frost.	Show.	Frost.	Show.	Frost.	Show.	Frost.	Show.	Frost.	Show.	Frost.
January . .	4	12	3	13	4	10	.	4	5	2	16	41
February . .	2	4	2	3	1	2	1	6	1	.	7	15
March . .	11	10	1	1	1	1	3	9	.	.	16	21
April . .	7	5	3	.	.	.	.	.	.	.	10	5
October . .	.	.	1	.	.	.	.	.	.	.	1	.
November . .	.	5	.	1	.	5	.	.	.	.	5	11
December . .	.	6	.	3	.	4	1	4	4	1	5	18
Total . .	24	42	10	21	6	22	5	23	10	3	55	111

TABLE VI.

STATE OF THE WINDS.

1837.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
MONTHS.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.
January . . .	4	.	.	2	14	1	3	7
February . . .	2	1	.	.	5	3	7	10
March . . .	2	2	4	1	2	1	6	13
April . . .	5	2	2	.	.	1	2	18
May . . .	4	4	3	.	.	2	4	14
June . . .	8	3	3	.	3	.	6	7
July . . .	8	3	3	1	3	1	5	7
August . . .	9	2	5	2	.	3	5	5
September . . .	6	4	5	2	1	1	2	9
October . . .	6	3	5	3	4	.	3	7
November . . .	5	.	2	1	2	8	9	3
December . . .	4	.	7	9	2	.	5	4
Total . . .	63	24	39	21	36	21	57	104

STATE OF THE WINDS.

1838.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
MONTHS.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.
January . . .	2	2	2	5	7	3	3	7
February . . .	6	1	.	1	5	4	3	8
March . . .	8	.	3	2	6	2	2	8
April . . .	7	.	.	2	1	.	2	18
May . . .	3	2	1	1	2	2	3	17
June . . .	4	5	1	4	2	1	.	13
July . . .	5	2	2	3	2	1	3	13
August . . .	3	1	4	3	3	1	5	11
September . . .	4	.	1	1	3	2	1	18
October . . .	1	2	.	6	1	3	1	17
November . . .	6	5	2	1	2	.	1	13
December . . .	2	.	.	3	15	1	1	9
Total . . .	51	20	16	32	49	20	25	152

TABLE VI.—CONTINUED.

STATE OF THE WINDS.

1839.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
MONTHS.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.
January . . .	4	.	1	.	2	.	15	9
February . . .	2	.	1	2	3	2	6	12
March . . .	.	2	6	2	2	1	11	7
April . . .	5	3	2	1	2	1	9	7
May . . .	5	5	3	1	2	1	5	9
June . . .	3	6	5	2	6	.	5	3
July . . .	6	4	5	2	1	1	3	9
August . . .	4	2	6	3	5	2	4	5
September . . .	3	.	2	1	5	6	7	6
October . . .	2	1	3	.	4	5	9	7
November . . .	5	3	2	1	3	2	5	9
December . . .	2	2	1	4	6	5	5	6
Total . . .	41	28	37	19	48	26	84	82

TABLE VII.

Extreme Temperatures during the years 1837-38-39.

MINIMUM.			MAXIMUM.		
Years.	Degrees of Fahrnt.	Date.	Years.	Degrees of Fahrnt.	Date.
1837	13	3rd January.	1837	88	23rd August.
1838	16	10th January.	1838	90	13th July.
1839	23	11th January.	1839	91	12th August.

On comparing the Tables Nos. I., II., and III., which have been prepared with considerable care, for the present work, from the best *data*, with that of Sir James Clark, No. I., which gives the mean annual temperature for each month, each season, and for the whole year, of several places in England and on the Continent, and of Pau among the rest, it will be perceived that the mean temperature in the majority of those divisions has been somewhat underrated. The *data* upon which Sir James Clark founded his table, in so far as Pau is concerned, are those furnished by Mr. Christison at Chateau Bilhères, from September, 1822, to July, 1824, and at Pau, Hôtel de France, Place Royale, from July, 1824 to May, 1825. The tables in the present work, as has been before mentioned, are from *data*, embracing a period of five years, furnished by M. Mermet.

We shall, for the sake of comparison and illustration, give a tabular *résumé* of both.

TABLE VIII.

Showing the Mean Temperature for each Month, each Season, and for the whole Year, at Pau, according to the authority of Sir James Clark, and that of the Author of the present work.

The mean annual temperature therefore of Pau is nearly 6° higher than London, and $4\frac{1}{4}^{\circ}$ higher than Penzance; it is about 3° lower than Marseilles, Nice, and Rome, and 17° lower than Madeira. In *winter* it is $3\frac{1}{4}^{\circ}$ warmer than London, and $1\frac{1}{2}^{\circ}$ colder than Penzance, 5° colder than Nice and Rome, and 17° colder than Madeira. But in *spring* Pau is $5\frac{1}{2}^{\circ}$ warmer than London, $4\frac{1}{2}^{\circ}$ warmer than Penzance, and $2\frac{1}{4}^{\circ}$ colder than Marseilles and Rome, and 8° colder than Madeira. "The range of temperature between the warmest and coldest months at Pau is 32° ; this at London, and likewise at Rome, is 26° ; at Penzance it is only 18° , and at Madeira 14° . The daily range of temperature at Pau is $7\frac{1}{2}^{\circ}$, at Penzance it is $6\frac{1}{2}^{\circ}$; at Nice $8\frac{1}{2}^{\circ}$; and at Rome 11° .*"

* CLARK, *on Climate*, p. 189.

CHAPTER IV.

**ENQUIRIES IN REFERENCE TO HEALTH, ETC., AS AFFECTING THE
NATIVE POPULATION OF PAU AND ITS NEIGHBOURHOOD. THEIR
DISEASES. PROPORTION OF DEATHS. LONGEVITY.**

A GOOD opportunity is afforded, once a week at Pau, on Monday, the weekly market-day, of observing the *physique* of the Bearnese population, at least of that part within seven or eight miles of it. Every road pours upon the town its tributary streams of peasantry to swell a throng, which renders the principal streets almost impassable. Independently of the picturesque effect produced by the lively and well-assorted colouring of their costumes, one cannot but be struck with the decidedly marked appearances of health in both sexes.

We do not see among this crowd the emaciation produced either by griping poverty, constitutional debility, or enervating vices, but a well-balanced tranquillity of manner, and a physical development not exaggerated but compact, which, little interfered with by art, conveys to the mind the impression of what a peasantry ought to be, neither above nor below its position, with health that knows no violent alternations, and a contentment, the fruit of the *mens sana in corpore sano*.

Among the women occasionally may be seen cases of *goître*, but these are chiefly from the marshy district of the Pont Long. They are much less frequent than in the adjoining district of Bigorre, where in some of the lateral valleys leading from Campan to Barréges, frightful examples of this disfiguring affection constantly force themselves upon the notice of the traveller.

Both men and women in Bearn, although tanned by exposure to the sun's rays, yet shew a clearness and uniformity of complexion with a firmness of fibre that distinctly mark the absence of a lymphatic *diathesis*. The features of the young females are regular and agreeable. They have not the freshness of complexion and luxuriosness of contour, which we see in the women of England; but there is much natural grace, and even the weights which they are accustomed to carry on their heads, produce in them a graceful balance, and give elasticity to their gait. Their complexions and good looks, however, fade much sooner than among the males. It is difficult after a female peasant has passed thirty years of age, to guess how old she is within fifteen years; but this decay is more apparent than real. The little shade which the handkerchief wrapped round the head affords to the features, is the principal cause. The sun beats upon their unprotected faces with a power desolating to their good looks; for hard-working as the females are, performing much of the out-

door work, they are only exempt from the sun's rays when they have both completed their diurnal duties.

The amount of work that the labouring females of this country, even to an advanced age, can undergo, is truly surprising, and taking into account the comparatively advanced period at which they cease to be prolific, this speaks much in favour of the climate, in first rearing such sound constitutions and preserving them so long materially uninfluenced by the attacks of time.

Mr. James, already quoted, in speaking of these people, says:—"I should suppose that the climate of Pau was healthy; the people seem strong, and with their brown skins, small black eyes, long dark hair, and the peculiar cap they wear, they put me in mind of the Calmuck Tartars. They are in general short, broad made, and muscular. In almost every other other country, we daily see mountains of flesh that look like *tumuli* for entombing the soul; but there is nothing of the kind at Pau. They are sturdy, but not fat; well-fed, but not pampered."

The observations which have been made, apply of course to that which constitutes the staple of every country, the producing class of labourers. This, indeed, is the one from which alone, particularly in a primitive agricultural state of society, any statistic deductions, valuable as a guide in appreciating the influence of climate, can be taken, while it serves as a scale by which to direct our researches in estimat-

ing the effects of climate, in its details, upon a higher class more artificially circumstanced, and whose cases are complicated by a difference of temperament arising from national and other causes.

Nor in noticing thus generally the beneficial influence of climate upon the native population, in thus gifting them with naturally well-balanced constitutions, can it be considered out of place, at this stage of the inquiry, to notice its ameliorating effects upon the peculiar people the Cagots, who were specimens of the worst and most disorganized consequences, arising out of a highly lymphatic temperament. Whatever may have been the origin of this afflicted section of human beings, though it is certain they were strangers to the soil and to the privileges of the laws, yet almost all traces of them have disappeared from Bearn, not altogether from the isolating severity of the regulations against them, but as Count Orloff, in his philosophic work on France, says, “*L'influence d'un climat salutaire, le temps et l'introduction de linge, qui paroîtrait avoir été ignoré, ont fait progressivement disparaître cette maladie.*”

In some districts, however, of the Hautes Pyrénées, not forty miles from Pau, these people are still to be found, so low in the scale of human organization, that to use the language of the same author:—“*Dans ces hommes qu'on voit traîner dans ces campagnes une vie languissante, dans un corps chétif, privé presque en entier de la sensibilité et de l'intel-*

ligence de notre espèce, et n'ayant on pourrait dire que l'irritabilité de certains végétaux et la faculté locomotive des brutes."

As in the early days of classic colonization the augurs examined the entrails of animals for a sign as to the success of their undertakings, so in the present day, we may be assured that the state of health enjoyed by the lower animals ought to be considered as an element in estimating the influence of climate. It will always be found that there is a symmetry of results, up to a certain extent, among them as among human beings. One cannot avoid being struck with the stunted, miserable aspect of cattle, for instance, in certain cold marshy districts in England, and there is a remarkable instance of the effects of climate upon animals, as well as man, in the state in which the traveller finds the herds of buffaloes in the Pontine marshes. The only vestige of the human race attached to this soil for miles, are the pale, bloodless herdsmen, dotted on the surface of this desolating waste, and the buffaloes they guard, with lean sides, tottering limbs, and staring skins.

If the augurs found in the entrails of the animals examined, marks of disease, they wisely considered that the gods were unpropitious: for the climate that could produce visceral disease in them, could scarcely be expected to spare animals of a more refined and tender organization. On inquiry, then, we have found that the domestic animals in the dis-

trict under consideration are hardy and little visited by disease, while amongst them there is a patience, a tractability, and freedom from vice, which one does not meet with in a more exciting atmosphere.

It is trusted that it may not be considered ridiculous thus,

Magna componere parvis;

but, among the moral and social qualities of the people, we find coupled with a *juste milieu* state of health, cheerfulness, and habits of reflection, and a freedom from crime unknown in the annals of political statistics.

The Author has the following fact from one of the judges of assize, that only *one* out of every 10,600 Bearnois is accused of crime; and it is said that a capital punishment has not taken place in Pau for the last twenty-three years.

The people of Pau, and its vicinity, are more phlegmatic and slow in their expressions and modes of action than we find generally among the French. They have not so much liveliness, and their gestures are more quiet and staid. The circulation of their blood is evidently carried on more slowly and equably, and the brain is consequently less impetuously acted upon by arterial stimulus. In times of political excitement and agitation they act with moderation, and having each some small stake in the stability of the country, are easily governed.

But this equanimity and functional quietude are

not altogether confined to the native population. They gradually steal, by a slow acclimating process, on the stranger. Every Englishman who has remained some time at Pau, whether ill or well, must confess, to a certain degree of self-satisfied dreaminess, to a considerable desire for present ease and for procrastinating to the future, to a much greater extent, than upon looking back upon the past, he would, at one time, have considered possible in his own case. Indeed so comparative an absence of organic irritation is there, usually, among the healthy, that it resembles the effects produced by a sedative. The pulse beats with a slow, soft, equable stroke, and the arterial excitement appears just sufficient to keep up functional action to the point that does not wear out the machinery.

While to an individual of naturally active mind these sedative qualities of the atmosphere upon mental exertion may, on review, be a subject of undefined regret, yet, their proximate cause lies at the root of the benefits derivable from the climate by valetudinarians of a certain class.

As a result of this non-irritating state of the atmosphere it may be stated, as a fact, with regard to the native population, that the rate of their pulse is permanently less than the average compared, *cæteris paribus*, with that of persons from more exciting and bracing climes, and what it wants in velocity it gains in smoothness and softness.

Their bodily functions, therefore, in health seem to be carried on with a great absence of active irritation, a consequence, no doubt, of their modified pulse. This temperament, it will be observed by the medical reader, is one little favourable to the approach of active membranous and glandular disease, to which persons, natives of more exciting and humid climes, are exposed.

As to the diseases to which the *native* population is subject, and the course they run, we have been anxious to obtain information from other sources than our own limited opportunities of judging of this matter. With this view we have conversed with the most eminent of the French practitioners, and have had the advantage of procuring results from the registers of the general hospital at Pau, as well as from extensive private practice ; and the result of the information written and oral is, that, 1. There is not in Pau any malady which deserves the rank of a predominant one. 2. That Pau itself is exempt from endemic and epidemic maladies of all sorts ; although at some distance to the north-east, and too distant to influence the health of the town population, there are certain uncultivated *Landes*, studded with marshes, which injuriously affect the health of the neighbouring inhabitants with diseases of an intermittent type. 3. That scrofulous and tuberculous diseases are found in a very small proportion to the population ; although they are occasionally developed from the

same causes which tend to produce them in other climates and communities, viz.; unwholesome trades; absence of the sunshine in crowded localities, confined air, poverty, and want of nourishing food. But as these agents are less in operation in Pau, and its neighbourhood, than in most other localities, they are, to use the language of Dr. Baile, physician to the public hospital at Pau, who has furnished the Author with several facts on the subject of the diseases of the native population, "a mon avis en assez faible proportion." This statement is fully borne out by the appearance of the people, scars of any kind, even those arising from the small-pox, being very uncommon. The Author cannot, at this moment, charge his memory, with having met, among the natives, any one with *cicatrices* about the throat and neck. 4. Rheumatism is not more common in Pau than in other places; that is, it is not a dominant malady, in such a form as to constitute it the disease which we find in Great Britain and Ireland, excruciating every muscle, fascia and articulation. But it forms a sort of running accompaniment rather, to imperfectly developed gout, depending on a congested state of some of the noble organs of life, produced by the sedative influence of the climate on the circulation, and nursed into continuance by diet and acid stimulating wines. With regard to rheumatism there is a popular, and there is a scientific belief; the former being, that the disease is very common; the

latter, that it is not so. It is usual for the people themselves to give loosely the name of rheumatism to all vagrant as well as more settled pains, which in their ignorance of nosological distinctions they call rheumatism ; when, in fact, it amounts frequently to nothing more than the usual effects of checked perspiration, from want of caution, and the pressure of congested veins on contiguous nervous filaments, from a deficiency of active circulation through the liver. This state of things, possibly, some gentle mercurial stimulant to the source of the symptoms, and an alkaline remedy, would essentially relieve, if not remove, in a great majority of cases. In the few instances of this kind among the French, which the Author has had an opportunity of treating in this manner, the symptoms have speedily yielded, and permanent good effects have been the result. Indeed, so strong a hold has this rheumatic nightmare got of the prejudices of the people, that if to assist a cure, it be necessary to keep a patient's mind easy on the subject of his real malady, his medical adviser, occasionally, yields to his ignorant fancy, and allows him to give his own appellation to the disease. 5. Bronchitis is not unfrequent at Pau, during the winter and spring ; but not of the acute character one meets with in England, or even in Nice, and the south-east of France. 6. Among the native children the usual grave maladies are cerebral congestion, and gastro-intestinal irritation ; but glan-

dular and mesenteric diseases are very rare. 7. Except among the plethoric and sanguine, where arterial excitement runs higher, the character and progress of diseases are of a comparatively mild type. In fevers of a continued kind, the symptoms always show a greater bias to the typhoid, than to the inflammatory; and there is a greater disposition to diseases of a congestive, than inflammatory description.

The population of Pau and its neighbourhood has possessed a very marked exemption from those epidemic diseases which have at different periods raged in Europe.

So far back as the middle of the fourteenth century, when the black plague cut off one fifth part of the European population, laying waste immense tracks of country, it is recorded, that the district of Bearn was exempt from the direful visitation: so also on other occasions, in times little less remote, has it stood forth as an oasis in the desert, free from pestilence, when the destroying angel stretched forth his hand over the palaces of the rich and the hovels of the poor in countries not far removed.

When the influenza, in 1837, extended itself with such fatal severity, not only in England but throughout France and the Peninsula, it did not assume at Pau the importance of an epidemic. It was a more ephemeral affection, running its course with mildness, and involving no prejudicial consequences in its train. At the distance of seventy

miles from Pau, on the Spanish frontier, the military movements of the opposing Carlist and Christino forces were for many days entirely paralysed from the prevailing epidemic,—whole battalions on both sides being on the sick list,—while at Pau only one death occurred, and that in the case of a person labouring under a complication of maladies.

It is unnecessary here to record the severity of its attacks in England and France. The obituary of those countries too eloquently testified its devastating power over the sickly and the aged ; and the legacies it left are now but too often visible in the shattered frames and ruined health of many whom the disease attacked, but failed at the time to conquer.

At the period also, when the cholera overran Europe in 1832-33, Pau and a small surrounding district were entirely exempt from its visitation. On the west and north and north-east, twenty-five miles distant, numerous cases occurred ; and there were some at Nay, nine miles from Pau; and on the south, where the disease invaded France on the side of Spain, the disease advanced within ten miles from Pau. But some meteorological qualities of the atmosphere had guarded the favoured district with happier precautions than any *cordon sanitaire* could have effected for it, for not a single case occurred within the distances mentioned.

The cholera approached Pau at three different periods, and from three different quarters ; the first

being from the north, the second from the east, and the last from the south. It has been remarked to us that, on these occasions, the winds proceeded for some considerable time from the quarters infested with the disease; and that as the latter approached Pau its progress was, in the three instances, providentially checked by the setting in of a westerly wind.

The public registers of Pau show the proportions of deaths, to the number of the population, to be highly favourable to it; how much more so than in many other countries will be evident from the following table, which presents an approximation taken from general statistical returns:—

In Pau	1 in 45 dies annually.
Birmingham	1 „ 43 „
London	1 „ 40 „
France, generally	1 „ 39 „
Leghorn	1 „ 35 „
Berlin	1 „ 34 „
Paris	1 „ 32 „
Lyons	1 „ 32 „
Strasburg	1 „ 32 „
Barcelona	1 „ 32 „
Nice	1 „ 31 „
Madrid	1 „ 29 „
Brussels	1 „ 29 „
Naples	1 „ 28 „
Rome	1 „ 25 „
Amsterdam	1 „ 24 „
Vienna	1 „ 22½ „

There are several provinces of France where the mortality ranges as high as one in twenty-seven. Along the south-eastern parts of France, viz., Provence and Languedoc, including Montpellier, Hyères, &c., the proportion is also considerably higher than in the south-west.

Not only is this proportion of deaths to the amount of population so much in favour of Pau, but the absolute range of life is remarkably high. This statement does not rest upon vague assertion, although it is much boasted of by the Bearnais. The following official tables will show what statistics have to offer upon this matter. We shall first take at random two of the annual returns of mortality for the department of the Basses Pyrénées, containing a population of 400,000 souls, for the years 1829 and 1831, as affording a fair average where "*tous les vieillards sont sains et robustes.*" The second table is a return of persons who have died in the town of Pau, out of a population varying from 11,000 to 13,500, from the 1st of January, 1832, to the 1st of January, 1842, from the age of sixty-five to one hundred years, given year by year. This last return has been furnished by the kindness of M. Nogué, the Mayor, who on all occasions has shown great politeness to the English.

TABLE I.

Return of Persons who have died in the Department of the Basses Pyrénées, from the age of 60 to 100 years, in 1829-31.

Years.	From 60 to 80.	From 80 to 90.	From 90 to 95.	From 95 to 100.	Above 100.
1829.	1073	693	150	52	9
1831.	1031	737	104	38	12

TABLE II.

Return of Persons who have died in Pau, from the age of 65 to 100, from 1832 to 1842.

Years.	From 65 to 70.	From 70 to 80.	From 80 to 85.	From 85 to 90.	From 90 to 100.
1832.	8	28	24	8	3
1833.	18	41	17	5	11
1834.	11	37	16	5	4
1835.	19	37	16	14	4
1836.	19	47	33	8	7
1837.	14	51	19	11	6
1838.	19	31	15	10	2
1839.	35	43	15	12	4
1840.	17	35	19	8	6
1841.	18	41	26	6	7
Total	168	391	200	87	54

By the last census, there were in Pau several persons, ranging from one hundred to one hundred and four years of age, and in the department also several centenaires, who are described as being still very healthy.

This proportion of longevity to the amount of the population, will appear surprisingly high to those who have studied this branch of statistics. Taking the population of Europe, although it is impossible to arrive at anything like accuracy, perhaps few places will be found to have supplied so large an amount to the small European aggregate. Haller, whose accuracy and industry are well known, collected together the most authentic facts recorded in his time, and found the following to be the relative proportions. Of men who had lived from

100 to 110 years the instances had been only 1000

110 to 120	"	"	60
120 to 130	"	"	29
130 to 140	"	"	15
140 to 150	"	"	6
150 to 169	"	"	1

By glancing at the second table, it will be perceived that the numbers who died between 80 and 85 are nearly one-third more than those between 65 and 70, and that the numbers from 70 to 80 are considerably more than double those who died from 65 to 70 years. It is needless to make any further remarks: the tables speak for themselves.

We thus find that the climate exerts upon the native population an influence, decidedly of a non-irritating character in health, and of a soothing and highly sedative kind in disease. The former is

evidenced by the constitutional slowness of their pulse, compared with that of persons in more exciting atmospheres, which keeps up an equable action in the functions of every organ; secondly, from the absence of sudden and violent alternations in their state of health; thirdly, from the prevalence of marked mental tranquillity, indicating the absence of bodily irritation; and lastly, from the high proportion of active and healthy longevity among the inhabitants. The sedative action of the climate on disease is found in the history of the maladies to which the native population is subject, running their course as they do with the comparative absence of strong arterial action.

CHAPTER V.

EFFECTS OF THE CLIMATE OF PAU ON THE ENGLISH STRANGER IN HEALTH. PROPORTION OF MORTALITY. THE CONSTITUTIONAL PREDISPOSITIONS TO DISEASE, OF WHICH THE CLIMATE MAY PREVENT THE DEVELOPEMENT. THE KIND OF DISEASED ACTION SUITED TO THE CURATIVE AND AMELIORATING INFLUENCE OF THE CLIMATE. THE KIND OF DISEASED ACTION AGGRAVATED BY THE CLIMATE. RESUME OF THE QUALITIES OF THE CLIMATE. THE THEORY OF ITS ACTION ON DISEASE. COMPARISON OF ITS CLIMATE WITH THOSE OF ROME AND NICE, ETC., IN REFERENCE TO HEALTH AND DISEASE.

WE shall commence this chapter by making a few observations on the effects produced on the Englishman in the possession of full health, on his first arriving in this country, and for some time afterwards, until he has undergone the acclimating process, which all more or less experience, from the undefined *mal aise* up to a more deranged state, chiefly arising from a congested condition of the liver, lungs, and brain.

The primary effect of the climate of Pau is sedative, diminishing nervous energy, and thus influencing the state of the arterial circulation and creating venous congestion. The symptoms the healthy stranger complains of, are a languor and listlessness, not proceeding from any deficiency of strength, but from a disinclination to exertion; a

sense of fulness in the head and chest, and oppression at the pit of the stomach. Injudicious exposure to the sun's rays, in such a state, is exceedingly likely to produce arterial reaction and accession of feverish symptoms more or less active; but all these may be obviated by care, and any severe climatising attack may be warded off. The use of a mild alternative purgative occasionally for a few weeks, the shower bath* on the head, the use of the flesh brush, avoidance of the sun's rays, and active exercise in the morning, or when the heat is not great, will be found effective precautions.

This regimen has been pursued by many, and by those who have practised it, no inconvenience has been felt, from the tendency the climate has to produce congestive disorders; but, on the contrary, a more equal state of health has been the result, even in the case of those whose temperaments were healthy to excess. We have seen, under the influence of the climate and of this regimen, the liability to those distressing headaches, attacking persons of a highly nervo-sanguineous habit, much lessened and in some cases entirely removed, and periodic attacks of inflammation prevented.

From exposure to the sun, the stranger, as well as the native, if not properly protected by warm clothing

* The Author has introduced into use in Pau a hand shower-bath, which answers the purpose very well.

and by shade, is liable to catarrhal affections and *coups d'air*. This liability may be almost entirely obviated by the wearing of flannel and thick clothing during the winter and spring months. This circumstance cannot be too strongly impressed upon all, whether invalid or not. Although the transitions of temperature from the sun to the shade are considerable, still they are less felt than at Nice, Rome, and other places possessing a higher thermometric range with the prevalence of sharp winds, yet it is at Pau a sufficient inconvenience to be anxiously guarded against by the invalid. In a climate, where the venous circulation is more languid than in an exciting atmosphere, it is necessary, by every auxiliary means, to keep up an action on the surface of the body.

The influence of the climate on English children, whose diseases generally arise from great arterial excitability, is more remarkably beneficial even than in adults; in females more than in males; in the sanguine temperament more than in the phlegmatic. The following description of the pulse at different periods of life and in different temperaments, points out the state of the circulation, whether arising from disease or from natural causes, which will be favourably influenced by the climate. "The pulse of the new-born infant is about 130 to 140 in a minute, nearly twice as frequent as that of an adult; but its frequency soon begins to diminish, its mean rate, during the first month, being about 120. During

the first year it falls to 110, during the second year to about 100; from the third to the sixth year, it may be estimated at about 90, and by the tenth and twelfth year it arrives at the state in which it remains for the greater part of life, being about 75. With respect to the two sexes, it is generally admitted that the pulse of the female is more frequent than that of the male, perhaps eight or ten beats in a minute; it likewise resembles the pulse of youth in its liability to be affected by all those circumstances which influence the state of the circulation. An analogous observation may be made with respect to temperaments. In the sanguine temperament where the constitution more resembles the state of youth and of the female, the pulse is more frequent and more irritable, than in that of an opposite character*."

As we have observed in a previous part of this work, when describing the influence of the climate upon the native population, the average quantity of their pulse was less than in persons arriving from more exciting atmospheres. We have found that the climate exercises also a similar influence on the pulse of strangers, after the lapse of time. The pulse in healthy persons is permanently reduced several beats, and acquires a more soft and equable character; and in proportion also among the sick as

* Dr. Bostock's *Observations on the Pulse*.

the symptoms become ameliorated, so is it attended by a permanent diminution in quantity and an improvement in the quality of the pulse. It is worthy of remark also, and which is almost a corollary to this result, that after some residence in Pau, the system becomes more sensitive to the action of remedies, and medicines which have a lowering tendency must be administered in considerably smaller doses than in Great Britain. For instance, salivation is readily produced, and remedies, whose action is to diminish the force and velocity of the pulse, such as *digitalis*, and the preparations of antimony, ought to be taken in diminished and diminishing doses.

For five years preceding the 1st of January, 1842, although the infant English population had been numerous compared with the adult, not one death occurred among them under the age of twelve years, although there were several, on their arrival, in a delicate state of health.

The proportion of mortality also among the English, for four years preceding the same period, is surprisingly low, when it is considered that there are proportionally more invalids to the whole number, than one finds in any given society in its usual state. While the annual rate of mortality in Pau, in the gross, has been shown by statistical returns to be as low as one in forty-five, that among the English has only amounted at an average to certainly

not more than one in sixty-five to seventy ; and the annual proportion of deaths from affections of the chest, has been one in one hundred and fifty.

Climate, as a remedial agent, has practically been too little considered in the light of a *preventive*, and too much as a *cure* for disease already established. In the disease most fatal to life,—consumption,—this truth constantly forces itself on the conviction of those who reside in climates enjoying a reputation for the alleviation or cure of that malady. Symptoms are too often permitted by the medical attendant at home for many reasons, but for which he is not altogether to blame, to arrive at a stage, where no human power and no climate can avail. The many varied irregularities of function which occur in frames predisposed to fatal pulmonary disease, and which, unless arrested by the change from an irritating atmospheric medium to one exercising a sedative power on the circulatory and respiratory machines, must prepare the way to a fatal catastrophe. The opportunity is lost at the point where, with any feasible degree of hope, permanent benefit might be expected to be reaped. It is not when deep organic injury, affecting life at its centre has taken place, that the cruelty of dispatching the dying sufferer to a distant country, far from cherished sympathies, should be perpetrated. The irritation of a long journey not merely accelerates death, but strews its bed with thorns. It is worth while, therefore, to

consider what those predispositions are, which experience and reasoning lead us to believe may be checked by the climate of Pau from progressing in their destructive career. We believe the following to be some of the most important:—

1. As the liability to strumous and lymphatic diseases in children is more a predisposition than an hereditary *germ*, it may not be illogical to infer that a climate, in which the native population is very sparingly visited with these affections, is one, if by times resorted to, calculated to repress the bias to their development.

2. Wherever among children or adults, whether of suspected strumous taint or not, there is the tumid abdomen, the uncertain appetite, the wasted condition, the waning strength, and the hurried small sharp pulse indicating the commencement of mesenteric disease.

3. Infantile predisposition to cerebral inflammation, false croup, spasmodyc asthma, and to inflammatory attacks in general.

4. The climate acts beneficially also in discouraging the generation of tuberculous matter, by diminishing irritation of the mesenteric glands and lacteal system, and consequently preventing its deposition in different structures.

5. In checking tuberculous deposits from coming to maturity, by diminishing the quantity of the pulse and the frequency of respiration; and thus, in the

lungs for instance, preventing inflammatory fluxion to the tuberculous points, which, as foreign bodies, under circumstances which increase the circulation, are liable to take on a softening process.

6. In all tendencies to disease depending on a nervo-sanguineous temperament, such as nervous headache, convulsive disorders in the same temperament, and liabilities to periodic inflammatory action : all aberrations of secretion depending on too high a state of irritability of the secreting organ.

7. Indeed the predispositions which are favourably influenced by the climate of Pau, may be summed up in one general principle :—viz., wherever it depends upon increased nervous and arterial action, permanently produced either by temperament or by some cause leading to more active disease.

The morbid condition of the system favourably influenced by the climate, is that depending on continued inflammatory irritation of some important organ, and which, either independently, or by sympathy, is being prepared for a disorganised state incompatible with life. As the mode of action of the climate is that of a direct sedative, modifying, and altogether reducing, where this is possible, irritation, both nervous and vascular, it is evident that the chief benefit derivable from it, is to be looked for, *par excellence*, in that stage of disease preceding, and if unchecked, leading to dangerous organic mischief.

This is more particularly the case in irritations of the mucous membranes, whether of the stomach or of the air passages ; for if continued irritation of the gastro-intestinal membrane be permitted to exist unchecked, it is sure ultimately to involve the bronchial membrane, most likely to induce the deposition of tuberculous matter in different structures, and ultimately the fatal softening of those deposits. Any one at all acquainted with anatomy, is aware of the intimate union of structure and of sympathy that exists between the stomach and lungs. The diaphragm which divides the cavities of the chest and abdomen, mechanically connects, by its lining membranes, the different organs one with the other. The effects of the intimate nervous sympathy created by the ramifications of the *par vagum* nerve, between the functions of digestion and respiration, are constantly visible in disease. Thus we frequently find that the symptoms of continued inflammatory irritation of the stomach itself, before the lungs even have become at all organically implicated in the mischief, in appearance frequently proceed from the chest. We shall not only have cough, but heavy mucopurulent expectoration, with vagrant pains confined to the region of the chest itself ; all which symptoms disappear by reducing the irritation of the digestive organs. Nor is it only by nervous and contiguous sympathy that the lungs take on diseased action, in the wake of long-continued stomachic irritation ; but

this state exerts a very decided influence on the circulation, urging the impetus of increased arterial action upon weakened and susceptible parts, and in the case of tubercles, in whatever structure they may be found, rousing those foreign bodies into a fatal state of activity.

The climate acts in the same way beneficially, where, from auscultation and from all the symptoms, the presence in the lungs of tubercles in a passive state may be ascertained to exist. *It affords, from the calm induced in the system, time to attempt by remedial means their absorption.*

In inflammations of the bronchi and trachea, to which public speakers are now-a-days so subject, where with a troublesome cough, there is scanty, viscid expectoration, alteration of the voice, increased pulse, gradual emaciation, and flying pains about the chest, the climate of Pau may be said to exercise its highest powers. The beneficial change observed is in a diminution of pulse, increase of expectoration, decrease of cough, and an improved state of *embon-point*. This diseased condition of the air passages, which most frequently follows on continued deranged state of the mucous membrane of the stomach, is a very important stage in the malady, which, too often, if neglected, terminates by dragging in the substance of the lungs themselves, and is frequently the last point in the scale of the disease, where climate and treatment can effect any lasting good.

It is in such a state of things, therefore, before the disease has proceeded further, that we warn invalids who can, to flee from the penetrating and irritating influence of a British winter and spring, and avail themselves instead, of a soothing and sedative climate. Not only in all cases of chronic inflammation of the mucous membranes, attended with quickened pulse, does the climate of Pau exert an almost specific influence; but after irritation has been reduced, and expectoration restored, the use of some of the Pyrenean waters in the neighbourhood, such as Cauterits, the Eaux-Bonnes, &c., infuse into them a fresh principle of vitality, and bring their action up to a healthy standard, altering not merely the deranged functions of the pulmonary, but also those of the abdominal mucous membranes.

In mesenteric disease at its commencement, the climate of Pau is also highly beneficial in checking its progress, and indeed in all diseases depending on continued arterial irritation of glandular and membranous structures.

We shall now make some observations on the subject of rheumatism, and we are the more induced to do so, because Sir James Clark*, misled by a French authority, has stated "that rheumatism is the only disease that is very common; it exists almost as an endemic, and simulates and complicates almost

* CLARK, *on Climate*, p. 192. Last edition.

all the other diseases ;" and again, " Invalids labouring under, or subject to attacks of rheumatism, should of course avoid Pau."

Among the English the Author has not seen rheumatism, in any one case, produced by the climate of Pau in an acute form; but he has seen several cases of acute rheumatism, complicated with gout, alleviated by a residence in Pau; the paroxysms becoming milder and less frequent. One most aggravated case of an officer now recurs to our memory, who had caught acute rheumatism from exposure to cold on the Himmalayah mountains. He had lost the use of his lower extremities, and occasionally of the upper, but after two years of severe suffering, and the use of different mineral waters in England and on the continent, was completely cured after a winter's residence in Pau, and a six weeks' use of the Cauterits waters. In this case the disease was complicated with circumstances connected with constitutional temperament, which aggravated all the symptoms. The attacks were so violent, as to produce enlargement of the ends of the long bones to a considerable size with much effusion surrounding the joints. These symptoms gradually yielded to the soothing influence of climate and treatment, and became more mild and chronic in their character; and eight months after his arrival, to the astonishment of all, his symptoms entirely disappeared. Worn down to a shadow before his

arrival from excessive irritation and want of sleep, ere he departed he had considerably gained condition, and is now again in as good health as ever, doing duty with his regiment in India.

There have been lately under the Author's care two gentleman, who had each suffered a martyrdom from acute rheumatic gout, to the extent of chalky deposits in different joints, and rheumatic inflammation of different *fasciae*. This state of things had occurred before their arrival in Pau, and was still in operation. One has remained some years in this climate without any decided inflammatory accessions of an acute kind; the other has passed last summer and winter at Pau and in the Pyrénées with comparative freedom from pain. Not one decided exacerbation of rheumatic symptoms occurred during the winter, and a remarkable improvement took place in the *embonpoint* of the patient, and in the greater sensibility of the system to the action of remedies.

Although the early part of the winter of 1841-42. was rather more rainy than usual, and not at all a favourable specimen of the Pau climate, a gentleman, a native of Ireland, who had in vain tried the climates of Rome and Naples, and who, to use his own words, was regularly hunted out of Ireland by rheumatism, confessed, that suffering as he had severely for many years, he had never passed so easy a winter since he had first been attacked, not having once had a return of his malady since his

arrival in Pau. He also made the observation, so common, and the cause of which appears so unaccountable to all, that rainy weather does not bring a humid state of the atmosphere, as in many other countries; that is, that the bodily feelings do not indicate the presence of moisture acting injuriously on symptoms hitherto invariably aggravated by cold and damp. In Ireland, on the approach of rain, his rheumatism was immediately and painfully increased, while in Pau no change in the state of his feelings was induced by it.

We shall mention another case which has come under our notice, of a gentleman, a native of Pau, who, during a long residence in London, had contracted a severe and inveterate rheumatism, which on his return speedily yielded to his native climate; and he has now been many years entirely free from an attack. Here is an instance, not where the disease has been produced by the climate of Pau, but where a native coming from another country has been cured by it; and where the individual has continued unattacked, *malgré* the strong predisposition which previous and long-continued paroxysms must have created.

We might multiply instances all to the same purpose, to show that, so far from the climate being favourable, under ordinary precautions as to diet and regimen, to the production of rheumatism, it possesses those peculiarly soft and sedative properties,

suitable in a marked manner to the alleviation and cure of the most painful description of rheumatism and rheumatic gout, viz., that connected with tonic irritation of the mucous membranes and increased arterial action in plethoric temperaments. In every such case which has come under the Author's notice, the acute symptoms had been invariably reduced to that standard, more compatible with the curative influence of the mineral waters of the Pyrénées, as shall be more fully explained in the sequel.

There are, however, varieties of rheumatism and rheumatic gout, as of other diseases, which are not, and cannot be, alleviated by the climate of Pau, and of these we now proceed to speak.

The diseased state of the system aggravated by the climate is, 1st. Where there is a general decline of irritability, or of the powers of life, as evidenced in atonic dyspepsia and in the long train of symptoms that accompany it, and in broken-down constitutions, from long residence in hot climates, where the functional energy of the liver has been reduced to the lowest ebb. 2. In the catarrh of old men, and in chronic bronchitis, where there is a great reduction of tone and excess of expectoration. 3. In chronic rheumatism, attended with a debilitated state of the digestive system, and complicated with atonic gout. 4. In all apoplectic tendencies depending upon passive congestion of any of the nobler

organs in leucophlegmatic habits. 5. In chlorosis, from absence of functional tone, and accompanied with a congested state of the uterus. 6. In all diseases where there are congestion of the venous system and diminished nervous energy.

To sum up then the qualities of the Pau climate, meteorologically and medically considered, we say, from all we have read, heard, or seen, that it possesses the following leading points: 1st. Its soil being gravelly to a great depth, absorbs most readily any quantity of moisture that may fall, so that there is no stagnant water to be reabsorbed into the atmosphere. 2nd. From the topographic features of the country surrounding Pau, it is almost completely shielded from wind, so much so that for weeks it is difficult to indicate the point from which the wind blows. 3rd. From the bias which the wind has to blow from the south-west, west, and north-west, we find, that, if in the morning, it proceeds from the east, at midday from the south, that more or less electric matter is thus generated. But the decline of the sun, in this case, seems to solicit the wind from the west, and to invite Atlantic vapour to absorb the excess of electric fluid, which, when not so expended, as in Nice, and in the south-east of France, exerts so irritating an influence on nervo-sanguineous temperaments, and on inflammatory affections of membranes and glands. 4th. Although we have considerable atmospheric variations at Pau, still, from the great absence of

agitation of the air, these variations pass innocuously over the invalid. Indeed, the human system, in health and disease, seems to partake of the same tranquillity which reigns abroad in the external world. 5th. The marked absence of free communicable moisture also in the atmosphere, as indicated by the hygrometer, is a state highly favourable to the alleviation and cure of diseases, the produce of exciting and humid climates. 6th. Acting on persons in health, the climate brings down the standard of tone, and modifies the natural temperament, the sanguine making a move towards the phlegmatic, and the choleric towards the melancholic. On the same principle, no doubt, it is, that diseases of a mixed, nervous, and inflammatory character, come to have their symptoms modified and frequently subdued. That kind of functional derangement of a tonic irritable type, which paves the way to severe organic lesion, it will be seen, from what has been previously said, is the state of things for the alleviation and cure of which the qualities of the climate are most suited, as well as in preventing the developement of pending predispositions. The Author also has occasionally observed continual irritation of the trachea and bronchi, as well as of pulmonary tubercles, accompanied with purulent expectoration, quick pulse, hectic fever, and emaciation, to be subdued by a transfer of action to the liver; a manageable state of congestion of this organ being the expense

for the relief of symptoms threatening to life. Three or four instances of this mode of amelioration have come under his notice during the last few years, where the patients are now entirely recovered from the pulmonary symptoms. In mesenteric irritation of children, also, there is often the same kind of beneficial transfer, most chiefly to the liver, and occasionally to the hæmorrhoidal vessels.

We shall conclude this branch of the subject of this work, by comparing some of the general features of climate observable in certain other places of the continent, to which the invalid resorts, relatively with Pau. The best evidence that can be offered will be given from the works of writers who have had no interest in exaggerating any circumstances unfavourable to the respective climates treated of.

And first, with regard to the south-east of France, viz., Provence and Languedoc. "Less rain falls here, I believe, than in any other part of Europe*. It is no uncommon occurrence for a drought to continue, without intermission, at Montpellier, Aix, and Marseilles, during four or five months together, while in the winter it is considerably drier and colder than in the south-west. The *Bise* and *Mistral* winds exert a most deleterious influence on delicate people in general, but more especially on those

* *Observations on Climate, Diet, and Medical Treatment, in France and England*, by CHARLES HIGGINS, M.D., p. 26.

whose lungs are implicated. We are aware how sensitive the pulmonary apparatus of phthisical patients is, and how injuriously cold acts upon it; in fact, a mild and balmy aerial fomentation, (if I may so say,) is by far the most efficacious palliative and check on the march of this desolating disorder."

Let us move still further to the east, and we have some of the features of Nice, so entirely opposite to Pau, graphically described by a resident physician, who very candidly records his opinion as to the injurious effects of its spring upon diseases, for which the climate of Pau, at all seasons, is uniformly suitable, namely, those of membranous and glandular irritation.

Dr. Farr* says, "Independently of the *Mistral*, from which Nice is more sheltered, from its topographical situation, than many other parts of Provence, the easterly wind sets in with the first moon in March, called by the natives the Blood-red Moon; it is severely felt by the invalid and those in delicate health, and even the strong feel and acknowledge its evil tendency. Last season the number of patients of all nations, labouring under affections of the chest, might have amounted to thirty; the great majority had greatly improved their state of health up to this period, and they were daily to be seen like butterflies in the sun, riding, driving, and walking

* *On the Climate of Nice*, by W. FARR, M.D., p. 16.

over hill and dale. I besought those whom I attended, and many whom I did not, to quit Nice before the birth of this fatal moon; but they heeded not my counsel, and thought I had overrated the danger. They remained, and the day after this easterly wind began, of the thirty I only met one afterwards, and him I had often previously pronounced to have no disease of the lungs."

There can be no two climates more opposite in their meteorological properties than Pau and Nice, and, experimentally, no two where the action upon disease is so oppositely marked. For all diseases requiring a sedative to the nervous and circulatory systems, the climate of Pau is peculiarly adapted; while for others of an opposite type that of Nice would seem in an equal degree to be beneficial.

"The grand objection," (says Dr. Farr, page 10,) "to Nice is its dryness, and the exciting and irritating nature of its atmosphere, but if, in some diseases, these are found to aggravate the malady, in others of an opposite tendency they are productive of good; so that the evil complained of in the one case, is counterbalanced by the good produced on the other. It is the fault of either the patient or his medical adviser, if he comes to a climate ill calculated to ameliorate his condition; but it detracts nothing from the reputed character of the climate in diseases in which it is known to be beneficial; it simply leaves the patient thus misdirected, and ill-sent, in a worse

condition than on his arrival. How often do these, however, who live and exercise their profession on the continent, see instances of patients being thus erroneously directed to many other climates besides Nice, and not to those alone, where air and climate are to effect everything, but even to those whose mineral waters are the therapeutic agents."

The diseases to which the native population of Nice is subject are of a more acute and inflammatory type than we find in those of Pau. Indeed, they are of a description little known in this place, and belong to a class of diseases, for the prevention and cure of which the climate of Pau is suited. Sir James Clark* says, "that catarrhal affections and inflammations of the lungs rank among the most frequent diseases. The latter is especially common and violent in the spring, and is generally complicated with irritation of the digestive organs." "Gastric fever and chronic gastritis are very common diseases. Indeed, gastric irritation appears to be very prevalent, and almost all other diseases are complicated with more or less of it."

The following valuable observations by Sir James Clark may almost serve as a guide, as far as they go, to those diseases in the alleviation and cure of which the Pau climate exerts so decided an influence; for we are convinced from considerable experience and

* CLARK, *on Climate*, p. 206.

observation, that the class of diseases described by Sir James as unsuited to the climate of Nice, are those suited to the climate of Pau, *et vice versa*. “In consumption*,—the disease with which the climate of Nice has been chiefly associated in the minds of medical men in this country,—little benefit is, I fear, to be expected from it. When this disease is complicated with an irritable state of the mucous membrane of the *larynx, trachea, or bronchi*, or of the stomach, the climate is decidedly unfavourable; and without extreme care on the part of the patient, and a very strict regimen, the complaint will, in all probability, be aggravated by a residence at Nice. Indeed, the cases of consumption which ought to be sent to this place are of rare occurrence. If there be any such, it is when the disease exists in torpid habits of little susceptibility, and is free from the complications just mentioned. In chronic bronchitis, which often simulates phthisis, very salutary effects are produced by a residence at this place.” Indeed, in all diseases connected with an atonic state of the system, such as the catarrh of old men, chronic rheumatism, and in all cases connected with torpor and relaxation of the constitution, the climate of Nice effects most beneficial changes, while the climate of Pau adds to the organic and functional atony.

* CLARK, *on Climate*, p. 206.

In fine, in judging of the relative merits of the two climates on health and on disease, we ought not to omit to bring before the reader the proportion of mortality in each.

In Pau one person in every 45 dies annually,

In Nice one „ „ 31 „ „
showing a great proportion in favour of the salubrity of the climate of Pau.

Differing, it has been seen, as the climates of Pau and Nice do, *toto cælo*, our next comparison, namely, with Rome, brings the qualities of the two climates more in accordance with each other. Still, with all the respect with which so excellent an authority as Sir James Clark deserves to be viewed, it is probable that the climate of Rome possesses a less sedative influence over active irritation of the bronchial membrane, combined with nervous dyspepsia and acute rheumatism, than Pau. Several instances have come to the Author's knowledge, where sub-acute irritable bronchitis, accompanied with troublesome cough, has not been at all benefited by a winter's residence at Rome, but has yielded to the Pau climate; at least, in so far as symptoms went, namely, in restoration of healthy expectoration and great diminution of cough. Also in cases of rheumatism and rheumatic gout, where Rome has failed to give that relief, for which sufferers have been obliged to leave home, Pau has effected the desired object.

It is practically out of the question, situated as a medical man is, in a small English society on the Continent, to give the details of individual cases. It would neither be acting up to his own duty, nor just to the feelings of his patients; all he can do with propriety, is to generalize into principles the experience he has had of cases. The Author can with truth say, that he has not manufactured any cases to suit the occasions; and that whatever rules or principles he may have propounded, are the results of experience anxiously considered.

There are so many points of suitableness to the same class of disease common to the climates of Rome and Pau, as laid down by Sir James Clark in his observations on the former, that we will quote them, satisfied that the learned author will not object to the use we make of his opinions. "It would appear that the climate of Rome, with regard to its physical qualities, is one of the best in Italy. One peculiarity of it deserving of notice is the stillness of its atmosphere, high winds being comparatively of rare occurrence. This quality of calmness is valuable in a winter-climate for pulmonary diseases, and to invalids generally, as it admits of their taking exercise in the open air, at a much lower temperature than they could otherwise do. To patients, labouring under bronchial irritation, wind is peculiarly hurtful." "Among the diseases benefited by a residence at Rome, I may rank consumption. In the early stages of this affection, I have generally

found the climate favourable. I have frequently known patients, who had left England labouring under symptoms that gave much and just alarm, and which continued during the whole journey, get entirely rid of them after a short residence at Rome. In bronchial affections, the climate is very generally beneficial, especially in the cases where there prevails much irritability of the mucous membrane, with much sensibility to harsh cold winds."

This description would, by substituting Pau for Rome, be sufficiently accurate as far it goes. Still it is presumed that there are circumstances connected with the former, *cæteris paribus*, which render it a more eligible residence for invalids similarly circumstanced. 1. In the first place, it is nearer to England, and easily reached by a short sea voyage. 2. While at an average there is an equal number of rainy days in both places, the soil of Pau is more absorbent, and consequently much less evaporation goes on. 3. Pau is not subject to periodic winds*, which in a

* "The Tramontana is a dry, keen, and irritating wind, resembling in its effects the cold winds of Provence, and is equally to be guarded against by invalids." Again. "In the months of March and April, winds are more frequent at Rome; they set in generally in the forenoon, and continue till sunset, when they subside, leaving the nights calm and serene. The effects of these keen spring winds, combined with that of a powerful sun, are severely felt by the sensitive invalid, though, as I could observe or learn from the testimony of others, in a less degree than at Naples and Nice, and perhaps even at Pisa."—CLARK, *on Climate*, p. 225.

short time undo much of the benefit derived from its more favourable weather. 4. Pau is not subject to any epidemic as Rome is. 5. Pau has not the inducement of long chilly galleries of fine arts, or the seductions of the opera to tempt the invalid from the regulated atmosphere suited to his case. 6. Pau has the advantage in winter over Rome, of the curative means of the Eaux-Bonnes, and other mineral waters of the Pyrénées, which are powerful auxiliaries to the climate in the treatment of some affections of the mucous membrane. 7. The neighbourhood of the watering-places of the Pyrénées, where, on the approach of summer, a few hours take the invalid into any variety of atmosphere the most suited to his taste or necessities, is a matter of some importance. 8. The expense of living at Pau is considerably less than at Rome, as there is no rivalry of equipage, or *pretension* of any kind kept up.

It seems on a review of the comparison of Rome and Pau, that the climate of the former is less favourable to the quietude of the nervous and circulatory systems than that of the latter. In Pau, the climate exerts a direct sedative influence on the nervous system, evidenced by the disappearance of symptoms particularly of a mixed *nervo-sanguineous* kind; thus, for instance, the beneficial effect it has on the distressing affection called nervous headache, occurring in irritable plethoric habits; whereas, in

Rome, the nervous system* of the natives has been so accumulated, that

They die on a rose of aromatic pain.

In Rome, during the spring months diseases put on severe inflammatory types; in Pau the type of disease is rarely in inflammatory excess. The tendency of constitutional disturbance, whether from local disease or as the result of atmospheric causes, is that of fever of the simple continued form, with a tendency to degenerate into the typhoid.

Although, then, there is a great resemblance in some of the general features of climate between Rome and Pau, yet it has been seen that there are also important distinctions, and the distinction is very remarkable also in the proportion of mortality in the two places.

In Pau one person in every 45 dies annually.

In Rome one , , , 25 , ,

It is not necessary to carry out our comparisons further: a reference to Sir James Clark's very lucid work will fully enlighten the reader upon all that is desirable to be known with regard to the merits and demerits of English and foreign climates.

* The next circumstance connected with the diseases of Rome, which deserves notice, is the peculiar sensibility of the nervous system of its inhabitants. This is evinced in a very peculiar manner by the disposition to convulsive affections, and the singular sensitiveness of the Romans, especially the females, to perfumes.—CLARK, *on Climate*, p. 230.

CHAPTER VI.

PYRENEES. EXTERNAL PHYSICAL FEATURES. GENERAL VIEWS OF THE NATURE, RELATIVE AGE, AND STRATIFICATION OF THE PYRENEAN ROCKS.

THE Pyrénées form a chain of rocks continuing without any interruption from the ocean to the Mediterranean, and are the most considerable of Europe after the Alps. Their situation is between 42° and 44° of north latitude, and between $50'$ of east longitude, and $3^{\circ} 5'$ of west longitude, of the meridian of Paris.

At first view we might suppose that the Pyrénées form a chain absolutely isolated, since their two extremities abut upon the Mediterranean and Atlantic seas; but on casting our eyes on the maps of France and Spain, we readily perceive that the Pyrénées are only part of a system of mountains of those countries, since they are prolonged towards the west to Cape Ortegal in Gallicia, and appear to connect themselves on the east with the chain of the Alps by the Montagne Noire and the Cevennes. The Pyrénées form the natural limits between France and Spain, the point where the waters divide on the southern and northern aspect of the great chain regulating the boundary between the two nations. Their length is about 85 leagues, and their

mean breadth 20 leagues, occupying a surface of 1198 square leagues.

The new territorial division of France comprehends the Pyréneés in six departments, viz.: those of Pyrénées Orientales, l'Aude, l'Arriège, la Haute Garonne, les Hautes Pyrénées, and les Basses Pyrénées.

Before the revolution the Pyrénées were divided into several countries, or districts, included in different provinces. It is certain that in remote antiquity these countries were inhabited by races whose origin, manners, physiognomy, and character, differed still more than their language. The *Roussillon* formed an independent province, comprehending the Vallspir, the Conflent, the Capsir, and French Cerdagne, and extending to Puycerda, where the Spanish Cerdagne commenced. After this, the *Donnezan*, a small country which nevertheless had its sovereign Counts, and preserved intact its privileges and singular usages: the *county of Foix*, so long governed by the princes of that sovereign house, had retained, under the kings of France, its own independent form of government: the *Couzerans* and the *Comminges* had also been governed by their Counts: the *Four Valleys*, whose form of government was democratic: the Bigorre, with their deliberative states: and lastly, Navarre, which, under the appellation of a kingdom, comprehended Bearn and the Basque country, the latter containing a popula-

tion the most extraordinary as to their language and manners of all the inhabitants of the Pyrénées.

The Spanish provinces, which correspond to the French departments, are, commencing on the east, Catalonia, the neutral territory of Andorre, Arragon, Haute Navarre, and Guipuscoa.

The direction of the Pyrénées*, as has been said, is from the east-south-east to the west-north-west, making an angle of 112° with the meridian. Nevertheless, although this indication be exact in itself, we should convey an erroneous impression of the Pyrénées, were we to say that the chain followed *one* line and that a *straight* one. On the contrary it is composed of two parts and of two lines, which have, it is true, parallel directions, but which are not prolongations the one of the other. It forms in the middle of its length an elbow; and its western part retires about fifteen miles more to the south, and then follows the same direction with the eastern part. We there observe a great number of smaller lateral chains, which detach themselves from the central one, towards the south and north, in directions more or less perpendicular, and which terminate either in the level ground, which bounds the mountains, or else go to form the boundaries of valleys. We meet

* On the geological branch of the Pyrénées, the Author gives a résumé of the large and detailed work by CHARPENTIER, entitled *Essai sur la Constitution Géognostique des Pyrénées*, 1823.

also with certain smaller chains, whose direction is parallel with that of the central one, and which are distinguished not only by their direction but by their structure.

The slope of the mountains, to the north, is more gentle and undulating than that to the south; and the declination of the Pyrénées, in their whole length, is more abrupt to the east than to the west. The great valleys are transversal; the longitudinal or parallel ones being of little extent; while the entrance of the valleys, from the plain, are sometimes wide, sometimes narrow. Those which abut upon others, are always more or less contracted at their entrance. The valleys present a succession of basins, and narrow gorges; and in the high regions, those basins are abruptly elevated the one above the other; so that the valleys, instead of presenting uniform declivities, form terraces, and ascend by tiers towards the summits of the mountains. We find in a great number of those basins, one or more lakes, and those in which we do not find any, show traces to lead us to presume, that they also have served, at a more remote period, to hold larger collections of water. The convergence of two or more valleys always terminates in one of those basins, and its extent is proportioned to the number and size of the gorges which open upon it. The mountains which form the boundary of a valley present rarely an uniform slope, from the base to the summit; but

they are interrupted, frequently, by terraces and rugged irregularities, which often correspond with those of the opposite side. The gorges and lateral valleys are sometimes so elevated above those on which they open, that the torrents are precipitated in cascades.

In place of a narrow and steep gorge, or of a succession of basins, which ascend by stages to the summits of the mountains, several valleys present from their origin one large basin, in form of an amphitheatre, such as the famed Cirque de Gavarnie, at the rise of the valley of Barrèges. We find on the northern slope of the mountains twenty-nine principal or traversing valleys, which all take their origin from the summit of the central chain; the number of those on the southern is twenty-eight. The waters which descend by the southern declination all fall into the Ebro, and those of the north run partly into the Mediterranean and the ocean. The water of the rivers and torrents proceeds chiefly from sources; that furnished by the melting of the glaciers is trifling, except at the commencement of summer.

The Pyrenean chain does not present an equal elevation throughout its whole length. From its rise in the Mediterranean to the Port de Pertus, its mean height is about 1800 feet. It then commences to rise considerably; and from the mountains which are at the bottom of the valley of La Teta to those of the valley of Vicdessos, the mean height is about

6600 feet. From this place to the valley of the Garonne, its mean elevation is 7200 feet. Here the chain sinks a little, in diverging to the south ; but at the Port d'Espot, where it resumes its original direction, it ascends anew, and shortly after, at the Port de Viella, commences the most elevated portion of the Pyrénées, which extends to the mountains situated at the extremity of the valley d'Ossau in the Basses Pyrénées, thirty miles from Pau. Its mean height is here about 7800 feet. From these mountains in the valley d'Ossau, the Pyrénées insensibly diminish in elevation, and terminate in a point which juts into the ocean and forms the promontory of Fontarabia.

There are several glaciers found in the Pyrenees, of which the principal are:—1. the Maladetta; 2. Crabioules; 3. Mont Perdu; 4. Brèche de Roland; 5. Vignemale; 6. Néouvielle. These are chiefly visible on the northern declivities of the most elevated mountains, where they form isolated masses, but do not descend into the valleys. The limit of perpetual snow, according to the observations of M. Ramond, who made the ascent of Mont Perdu, is 7500 feet above the level of the sea. The climate is in general mild in the Pyrénées. It is hotter at the two extremities of the chain than in the countries situated in the centre, the eastern extremity possessing the highest temperature, occasioned by its being nearly a degree more to the south than the western.

The vegetation is very luxuriant in the mountains, particularly in the basins situated near the base of the chain; and the *pics* of secondary elevation are covered with the black pine to their summits, giving to them a more clothed appearance than the same classed mountains of the Alps display.

The mountaineers give the name of *port* to the opening or depression on the crest of the mountains which divides two valleys, and which affords a passage from one to the other. The greatest number of these *ports* are placed at very considerable elevations, possessing in their neighbourhood the shelter of a rocky *hospice*, the value of which, as a place of refuge, would be fully appreciated by any one overtaken in a storm on those inhospitable heights. The dangers which there menace the traveller are felt to be so great, as to give rise to the proverb, “*Là, le père n'attend pas son fils, et le fils n'attend pas son père.*”

The following is the height of the principal mountains ascertained by Reboul and Vidal:—the Maladetta, 10,600 feet; Mont Perdu, 10,570 feet; Vignemale, 10,300 feet; Sommet Cylindrique, 10,200 feet; Pic Long, 10,000 feet; Tour de Marboré, 9,800 feet; Néouvielle, 9,800 feet; Brèche de Roland, 9,400 feet; Pic de Midi de Bigorre, 9,036; Pic d'Arbezón, 8,880 feet; Pic Montaigu, 7,314 feet; Pic de Bergons, 6,504 feet.

From the observations made by Saussure and

Ramond, the height of the Pyrenean mass is in general greater than that of the Alps, although certain *pics* of the latter exceed those of the former by 3,000 and 4,000 feet; and both have the quality in common, that their northern declination is more gentle, and the southern more abrupt.

According to the opinion of Charpentier, the mineral masses which compose the frame-work of the Pyrénées, appear all to belong to the class of rocks commonly designated under the name of *Néptunien*. He asserts that he never found in these mountains volcanic rocks, nor any mineral substance whose properties have been changed by the action of subterranean fires. The *Basalts*, which are so widely diffused over several countries, and whose igneous origin has given rise to so many discussions, are not here met with. Nevertheless we find extensive dépôts of modern *amphibolique* rocks, whose mode of formation is extremely equivocal, and as to whose origin, the present state of geological science does not enable us to decide.

The theory of Ramond is, that the Pyrénées were originally limestone mountains, and that the granite forced itself up in a liquid state. It does not enter into our plan to discuss the merits of the Huttonian and Wernerian theories; although we may say, that there are several circumstances connected with the geology of the Pyrénées that appear irreconcileable with Charpentier's theory. The Author, however,

desires to steer clear from partisanship on one side or the other.

We find in the chain all the principal formations noticed by geologists, and in the same order of superposition, as in most similar geological circumstances. The primitive structure consists chiefly of granite, micaceous schistus, and primitive limestone. The transition rocks are principally composed of argillaceous schistus, common grauwacke, schistous grauwacke, and limestone. The secondary formation is red sandstone, Alpine limestone, Jura limestone, and trap, which repose on the primitive in an irregular stratification. The different formations are disposed in bands, which extend from east-south-east to west-north-west, parallel to the principal direction of the Pyrenean chain.

The granitic structure forms a single band, which we may compare to a series of mounts and protuberances, which do not touch except by their bases, and which are often only connected together by rocks of a more recent formation. It does not constitute the chief summits of the Pyrénées, except in a small number of instances, but is removed from them a little to the north. It is more regular in the eastern than in the western part of the Pyrénées. The micaceous schistus forms an irregular band to the north of the granite, but it appears that there has also existed another situated to the south of that formation.

The primitive limestone forms a single band, placed to the south of the granite, and which extends with a great deal of regularity from the valley of the Arriège to that of the Garonne.

The transition formation is the most extensive of the Pyrénées. It forms two great bands, which run along the primitive chain, on the south and on the north. The different rocks which compose it have a like arrangement. The red freestone constitutes also two bands; that on the north of the primitive formation is situated almost at the foot of the Pyrénées, and shows less regularity and less continuity than that which runs along the primitive formation on the south, and which we find very near to the summit of the chain.

The Alpine limestone is the most common rock of the secondary formation of these mountains, and forms equally two bands. The southern occupies almost all the southern declivity of the Pyrénées, while that which is to the north constitutes only the smaller mountains at the foot of the chain. The Jura limestone is very little prevalent, and appears to be confounded with the Alpine. It is found chiefly at the northern base of the eastern part of the Pyrénées. The secondary trap does not form bands, as the other rocks, but small mountains and isolated masses, placed commonly at the entrance of valleys.

The direction of the strata of rocks is in general

from the east-south-east to the west-north-west, parallel to that of the chain. It is the primitive chain which has determined the direction of the rocks, and their inclination has been equally determined by the slope of the granitic chain. The dip of the strata is commonly above 45°.

We observe frequently great distortion of the strata in all the formations; but chiefly in that of transition. The different accompanying circumstances would lead us to presume that they had presented these irregular forms since their origin. The arrangement of the rocks seems to indicate two great revolutions which the chain of mountains had undergone before the formation of the valleys. The first appears to have taken place before the existence of the transition formation, and to have destroyed a great part of the primitive structure by furrowing the chain and by reducing it into a series of protuberances. The second great revolution may have taken place after the existence of the secondary formation, and a considerable lowering of the summits of the chain, and of the northern declivity, may have been the consequence.

CHAPTER VII.

DESCRIPTION OF THE DIFFERENT FORMATIONS. FIRST PRIMITIVE FORMATION. ITS COMPOSITION, CONSISTING CHIEFLY OF GRANITE, MICACEOUS SCHISTUS, AND PRIMITIVE LIMESTONE. PYROXENE EN ROCHE. TRAPP PRIMITIF.

THE *primitive formation* constitutes the least part of the Pyrenean mass; it is more often found on the northern than on the southern aspect of the chain, and does not form the summits of the chain except in very few instances; but seems to constitute itself a particular chain, or rather a series of protuberances, whose summits often surpass in height those of the central chain. Its composition is of very great simplicity; the rocks which compose it being in general distinctly stratified; their direction being from east-south-east to west-north-west, as those of the chain, and their inclinations being absolutely independent of the declivities of the chain.

The granite is the most common *primitive* rock of the Pyrénées, being in the proportion of eight-tenths of the whole formation of this class. It presents numerous varieties, of which the most common is the small-grained granite, in which the mica is frequently found mixed with talc. It happens even sometimes that the talc replaces entirely the mica. The essential constituent parts of the Pyrénées

undergo several peculiar modifications. It is often mixed with minerals not essential to its nature, such as amphibole, tourmaline, grenat, epidote, parathine, prehnite, chlorite, fer oligiste, fer sulphuré, zinc sulphuré, and graphite*. It contains also many strata alien to its composition, such as those of gneiss, schiste micacé, quarz, feldspath, limestone, amphibole, grunstein commun, grunstein schisteux, graphite, fer oligiste, fer spathique.

The granite is frequently cracked and traversed by fissures, several of which appear to be of a date shortly posterior to the formation of the rock. It is little abundant in metallic substances; it incloses only certain ores of lead in veins, and of iron in strata. The granite of certain parts of the Pyrénées is very susceptible of change. This alteration is more remarked at the extremities of the chain, and at the base of the granitic mountains, than in the centre. We often observe in the Pyrénées instances of the granite passing into other rocks, which may be considered as a simple anomaly of granite, because they are contemporary with, and composed almost of, the same elements. Some granites also display peculiarities, one description containing small irregular rounded masses of a micaceous granite of smaller grain than the principal mass, or of common grunstein; while others are traversed by veins, the

* The *Nomenclature* of Mons. CHARPENTIER is strictly adhered to.

mass of which always resists better the action of the atmosphere, than the mass of the rock itself.

The granitic supports all the other rocks of the Pyrénées ; it is, consequently, the most ancient of the mountains; but it has several peculiar characters, which leads one to presume that it belongs to the latest epoch of all the granitic formation.

The western granitic chain is not a prolongation of the eastern; but the two chains form two parallels, distant one from the other about twenty miles, and joined together by an elbow, projected near to the rise of the valley of the Garonne. The two granitic chains, parallel to each other, are equally so to the principal direction of the entire Pyrenean chain, taken from the separation of the waters between France and Spain. In conclusion, the form of the granitic mountains depends very much on their height, the low mountains presenting ordinarily gentle slopes and rounded summits, and the higher ones of the same formation having rapid declivities, frequently interrupted by rugged irregularities and terraces, and terminating in needle-formed peaks, or in sharp and jagged crests.

The formation of schiste micacé is composed of schiste micacé, schiste argileux, and schiste talqueux. The former, properly speaking, is the prevailing rock, and it appears that the other two are simple modifications of it. The schiste micacé presents numerous varieties: it is ordinarily in small and

very short leaves of mica, containing few of its crystals. The schiste argileux is commonly found in very fine small plates, more or less wavy: it is brilliant, and even sparkling, and passes sometimes into schiste micacé, sometimes into schiste talqueux, which latter partakes most commonly of quarz, with short and very compact fibres.

The minerals accidentally mixed with these rocks are, macle, grenat, graphite, and fer sulphuré. These rocks are usually very distinctly stratified, and the strata often present very varied curves and twistings.

This formation contains strata of limestone, quarz, amphibole, graphite, granite, grunstein commun, porphyry, and feldspath compacte. It contains also some small veins of plumbago and sulphurous pyrites.

This structure seems to have immediately followed the granite formation, and we observe even the passage of one kind of these rocks into the other. It mounts to a considerable elevation, but does not attain the height of the granitic summits. It forms large isolated dépôts situated on the northern side of the granitic chain, which appear to be the remains of a continuous band, parallel to the general direction of the Pyrénées, and probably destroyed by posterior revolutions. It is very likely that at one time a similar band had existed to the south of the granitic chain. The most considerable dépôts of schiste

micacé are to be found in the western part, and upon the northern slope of the Pyrénées.

There exists in the Pyrénées a formation of *primitive limestone*, peculiar and independent. The structure of the calcareous rock, which is the base of this formation, is sufficiently varied, but it is most frequently saccharoid. This rock is ordinarily rendered phosphorescent by heat, and several varieties of it exhale, by friction, a hydro-sulphuretted odour. We find accidentally mingled with the limestone, quarz, tremolithe, epidote, couzeranite, (a substance which appears to be new,) macle, talc, mica, fer sulphuré, and compact brown oxide of iron.

The limestone rock is stratified; but the strata are sometimes so thick that they are not easily recognised, and the rock then appears to be *en masse*. It includes beds of pyroxene, or augite, grunstein commun, and grunstein compacte. The primitive limestone contains few mines, these consisting only of some beds and veins of compact brown oxide of iron, mixed sometimes with pyrites martiales, pyrites cuivreuses, and cuivre vert pulvérulent. It contains grottos, some of which are very large: its formation appears to have been posterior to that of the schiste micacé.

The greatest elevation which this formation attains is estimated at from 5000 to 6000 feet above the level of the sea, and constitutes a very regular band of about 25 leagues in length, situated to

the north of the geographic central chain, and to the south of the granitic. This band extends from the valley of Oicdesso to that of the Garonne, traversing the valleys of Erce, Uston, Sallat, Castillon, and Ger. The external form of these mountains of primitive limestone resembles that of the granitic, with the exception that they are in general more sterile, particularly in those places where the limestone passes into the state of dolomite.

Pyroxene en roche, or augite, the rock of which we are about to speak, does not constitute an independent formation, but is subordinate to the primitive calcareous one; in stratification parallel, but interrupted. We owe our first knowledge of it to Mons. Lelievre, who, in a letter inserted in the *Journal de Physique*, May, 1787, made known his discovery to the mineralogists. He supposed that the rock in question was a variety of the chrysolithe, while some geologists have considered it a variety of epidote, and others, again, have given it the name of thersolithe.

The pyroxene en roche is a homogeneous substance of a grano-lamellated texture, which in some specimens passes to the schistous texture, and is ordinarily of a green colour, from that of the olive, through the different shades to that of the emerald. It is, however, sometimes brown and grey. It is only found *en masse*. It is shining, sometimes brilliant, and in some varieties vies with the diamond.

To sum up its general geological properties, the mineral hitherto known under the name of thersolithe, is a variety of pyroxene; and it is mingled accidentally with other mineral substances, which disguise its nature to the extent that it is with difficulty recognised. It is stratified; but in consequence of numerous fissures, with which it is usually traversed, it is often difficult to determine the true fissures of stratification. It includes no foreign strata, nor particular beds of minerals, and takes often an appearance analogous to the serpentine, in mixing itself intimately with talc. Its great extent entitles it to rank among the rocks; for it is more widely found in the Pyrénées than one would suppose, and its affinity for the talc seems to indicate its place between the serpentine and the trapp primitif, with which there is in other respects some external resemblance.

There does not exist in the Pyrénées an independent formation of primitive trapp; all the trappean rocks which we meet with being subordinate to other formations. That of the schiste micacé, which we find between the valley of Aure and Cauterets, contains the most considerable mass of primitive trapp, which, however, is divided into strata, which alternate with all the rocks that enter into the composition of the schiste micacé formation. The trappean rocks of that district are the feldspath compacte, grunstein compacte, grunstein schisteux,

and amphibole schisteuse. These contain a great number of foreign minerals, quarz, feldspath, grenat, axinite, tremolithe, epidote, pyroxene, prehnite, stilbite, harmotôme, idocrase, mica, asbeste, amiantoïde, fer sulphuré, graphite, nickel arsenical, and cobalt gris. All the rocks are most distinctly stratified, and their strata often present fantastic inflections and curves. The trappian structure of the mountains of Barrèges is subordinate to that of the micaceous schistus, and appears to belong to the most ancient period of that formation. It forms a band in the micaceous schistus, situated at the western part of the Pyrénées, at a great distance to the north of the geographical central chain, and at a very short distance to the north of the granitic band. It extends from east to west, nearly parallel to the principal direction of the Pyrénées. The trappian rocks reach from the valley of Aure to that of Cauterets, coursing along the valley of the Bastan to the south. The length of this band may be about five leagues, and its mean thickness about a quarter of a league. In fine, the mountains which contain the trapp are in general steep and rugged, and in a striking state of decay and degradation.

CHAPTER VIII.

1. OF THE FORMATIONS OF TRANSITION. 2. SECONDARY FORMATIONS. GRES ROUGE. CALCAIRE ALPIN. GRUNSTEIN SECONDAIRE (OPHITE OF MONSEUR PALASSOU.)

Of all the classes of formation which we meet with in the Pyrénées, that of transition is without doubt most widely diffused. In general, with the exception of a small number of instances, it constitutes the summit of the whole central chain, and for the most part also it forms the less elevated mountains, with which the French valleys, at their entrance, are bordered at the base of the northern slope. It is met with, without any interruption, from one extremity of the chain to the other; for it coasts along or environs the vast primitive protuberances, which elevate themselves, from its bosom, like small islands. Its extraordinary thickness is proportioned to its extent in length, and it may be said without exaggeration, that the transition formation constitutes two-thirds of the whole chain.

These rocks of transition are, in the order of their most frequent occurrence, the schiste argileux, calcaire, brèche calcaire, grauwacke schisteuse, grauwacke commun, and quarz compacte. The schiste argileux and the calcaire are the predominant rocks in this formation.

The principal varieties of the schiste argileux are the schiste argileux ordinaire, the schiste argileux ardoise, the schiste argileux micacé, and the schiste argileux terreux.

The principal varieties of the calcaire are the calcaire compacte, the calcaire schisteux, and the calcaire grenu. The brèche calcaire is commonly subordinate to the calcaire.

The quarz of transition constitutes a particular variety designated by Monsieur Brochant, by the name of the quarz compacte; it is commonly subordinate to the schisteuse argileux. The grauwacke schisteuse is more common and equally subordinate to the schiste argileux.

The strata, or foreign masses, subordinate to the principal rocks of transition, are, the schiste à aiguise, schiste alumineux, schiste argileux graphique, anthracite, schiste siliceux, feldspath compacte, porphyre à base de feldspath, grunstein commun, steatite endurcie gypse, fer spathique, and fer hydraté.

The minerals which accidentally accompany the intermediary rocks are, dipyre, amphibole, macle, quarz, cristallise, fer sulphuré ordinaire, fer sulphuré blanc, fer spathique, plomb sulphuré, and zinc sulphuré.

Minerals in strata and veins are found in the transition formation. Those which form the strata are, the fer hydraté compacte, fer hydraté fibreux,

and the fer spathique. These are most commonly found in the limestone. The metals observed in veins are, lead, iron, copper, zinc, antimony, manganese, cobalt, bismuth, nickel, and arsenic. The strata only are worked to advantage, the veins being too poor and too scantily diffused to cover the expense of working.

The transition structure contains the remains of organised bodies, both animal and vegetable. The débris of animals is most commonly met with in the calcareous rocks; that of vegetables is peculiar to the schiste argileux and to the grauwacke schisteuse.

The transition structure is the result of a single formation which has followed that of the primitive, the space of time that had elapsed between those two formations appearing to have been very considerable.

The transition formation constitutes two bands, which extend from the east-south-east to the west-north-west, being separated by the band of the primitive rocks. Nevertheless, they touch and are confounded with each other on several points. It attains, on the Pic Long, the elevation of 10,000 feet. The northern band of intermediary rocks forms the chief part of the mountains of the middle region, and of the inferior region of the French valleys. The southern band constitutes, in a great many places, the summit of the central chain and the superior region of the Spanish valleys, chiefly in the Oriental half of the Pyrénées.

The shape and aspect of the transition mountains vary very much, being dependent on the nature of the rock which constitutes them, as well as their elevation and position in regard to the central chain.

The secondary formation, of which the red sandstone is part, constitutes two bands in the Pyrénées, one of which is situated to the north, the other to the south of the central geographic chain. The red sandstone is composed of sandy rocks, usually flinty, cemented with clay, and coloured red by the oxide of iron. This formation reposes immediately on the rocks of transition, or when they are wanting, on the primitive formation.

The secondary formation is composed of grès rouge, grès blanc, grès schisteux, and poudingue. With the exception of some beds of limestone, these rocks do not contain any foreign strata. The minerals accidentally met with, disseminated in the grès rouge, are, fer sulphuré, fer hydraté, and cuivre pyriteux. We find also veins of fer spathique, and small veins of quarz, containing cuivre pyriteux. The baryte sulfatée laminaire, rarely accompanied with a small portion of cuivre carbonaté and ocre de fer, frequently forms veins in the red sandstone. Organic remains are very rarely found in this formation. It covers in stratification, not parallel, the intermediary and primitive rocks, and its formation is anterior to that of the other secondary rocks.

Of the two bands to the north and to the south

of the principal chain, the first has undergone great changes, and now presents but isolated dépôts, placed here and there on the small mountain chains which separate the valleys. The southern band is better preserved, and has more continuity. The greatest height which those rocks attain is 6500 feet. They appear to be absent at the eastern extremity of the Pyrénées; but are very much diffused in the west. They have comparatively little thickness, and do not form, of themselves, large mountains.

The calcaire alpin rocks form nearly two-thirds of the secondary formation. They present a great many varieties, which nevertheless may be designated under three principal heads, the calcaire homogène, calcaire sablonneux, and calcaire argileux. There exists in the low part of the department of the Ariège, a dépôt of limestone, which may be likened to the Jura limestone, but which appears to form part of the Alpine limestone, or at least to be intimately united with it.

The calcaire alpin contains in subordinate beds, grès, brèche chaux carbonatée fetide, marne compacte, houille, fer oxyde globuliforme.

The minerals mixed accidentally with the calcaire alpin are quarz néopêtre, passing commonly to the state of quarz agate pyromaque, soufre, fer sulphuré, and cuivre pyriteux. This formation contains also many marine fossils, and forms grottos, as in the valleys of Gistain and of Brotto. The calcaire de

Jura, in the neighbourhood of Max d'Azil, contains a very fine grotto, through which the small river of Larize runs.

The formation of the calcaire alpin has immediately succeeded that of the grès rouge, on which it is placed in parallel stratification, and presents two bands, the one on the southern, the other on the northern slope. The first extends in many places from the base to the summit of the chain, whilst the latter forms only the low mountains by which the Pyrénées terminate on the plain. This formation reaches, as on MontPerdu, to the elevation of 10,500 feet.

The southern band forms a great part of the mountains of Corbières, the mountains of the low parts of the department of the Arriège, those at the entrance of the valley of the Garonne, and of the valley of Aure, and the soil of the low parts of the department of the Basses Pyrénées. The southern band constitutes a great part of the soil of Catalonia ; it reaches the valley of Essera, under Sahun, and is continued to the valley of Roncal, in Haute Navarre. The mountains present varied forms, but, generally, they are lengthened in the direction of their strata, their declivities are broken by steep descents, and their *apices* are commonly inclined in the course of the stratification.

The amphibolique secondary formation of the Pyrénées is formed of amphibolite or diabase, which

Monsieur Palassou designates as ophite. The ophite presents three chief varieties, under the names of ophite grenu, compacte, and ophite grossier. The minerals which are accidentally found in the ophite are, fer oligiste, fer oxydulé, fer sulphuré, cuivre pyriteux, mica, talc, asbeste, epidote, stilbite, prehnite, and quarz. The ophite is very subject to decomposition, and is divided into globular masses by the action of the atmosphere.

The stratification in the ophite is not very distinct. It is traversed by a great number of accidental fissures. The ophite acts upon the needle from the fer oxydulé and fer oligiste which it contains. It shews no indication of organic remains.

The ophite is habitually accompanied with argile, gypse and calcaire; the argile is constantly ferruginous, and contains even veins of pure pulverulent fer oligiste; the gypse is less abundant than the argile, to which it appears to be, usually, subordinate; it contains fer oligiste, and mineral salts, which give rise to the saline sources. The calcaire also contains fer oligiste, and is often changed and becomes cavernous, when it approaches the neighbourhood of gypse.

The ophite and the rocks which accompany it, appear to be very modern, and perhaps posterior to the excavation of the valleys of the Pyrénées; while the opinion of geologists is divided as to the origin of the ophite, some claiming it as a neptunian,

others as a volcanic production. It is found chiefly in the inferior regions of the valleys and at the base of the chain, its greatest elevation above the level of the sea being about 4000 feet.

The ophite exists in both slopes of the chain ; it is more frequent in the western than in the eastern part of the Pyrénées, and it abounds in the *Landes* of *Dax*, and presents itself in the form of small mountains, or flattened isolated hillocks, sometimes conical, sometimes elongated, and terminated by a plateau, or rounded crest.

CHAPTER IX.

RESUME, ACCORDING TO THE CLASSIFICATION OF LINNÆUS, OF
THE BOTANY OF BAGNERES-DE-BIGORRE, BARREGES, CAU-
TERETS, EAUX-CHAUDES, EAUX-BONNES, AND NEIGHBOURING
AND INTERMEDIATE VALLEYS AND MOUNTAINS, BEING THE
WATERING-PLACES MORE PARTICULARLY DESCRIBED HERE-
AFTER.

As the Author meditates, at some future day, giving to the public a minute description of the botanical specimens found in the neighbourhood of some of the watering-places of the Pyrénées, as well as of their mineral and natural history; and as any particular details of the species would encumber too much the present work, it has been considered sufficient to give, in a condensed form, a list of the *species* found within the districts mentioned. This table has been put into form from a manuscript in the Author's possession, minutely describing the different species appertaining to each genus, and the localities as to aspect and elevation, where each specimen had actually been found. This has been done, with the hope that the information, meagre as it is, may act as an incentive to the healthy, and even to the invalid not incapacitated by severity of illness, to search for instructive amusement as well as health.

CLASS 1.

MONANDRIA Monogynia.

- 1 *Hippuris vulgaris*
 2 *Salicornia herbacea*
MONANDRIA Digynia.
 3 *Callitricha verna*
 4 — *stagnalis*
 5 — *autumnalis*

CLASS 2.

DIANDRIA Monogynia.

- 6 *Ligustrum vulgare*
 7 *Phillyrea angustifolia*
 8 *Circæa lutetiana*
 9 — *alpina*
 10 *Veronica agrestis*
 11 — *hoderæfolia*
 12 — *nummularia*
 13 — *alpina*
 14 — *bellidioides*
 15 — *fruticulosa*
 16 — *saxatilis*
 17 — *poneæ*
 18 — *spicata*
 19 — *allioni*
 20 — *officinalis*
 21 — *serpyllifolia*
 22 — *aphylla*
 23 — *montana*
 24 — *chamaedrys*
 25 — *scutellata*
 26 — *beccabunga*
 27 — *teucrium*
 28 *Pinguicula vulgaris*
 29 — *grandiflora*
 30 — *longifolia*
 31 — *lusitanica*
 32 — *flavescens*
 33 *Verbena officinalis*
 34 *Lycopus europæus*
 35 *Salvia officinalis*
 36 — *pratensis*

DIANDRIA Digynia.

- 37 *Anthoxanthum odoratum*

CLASS 3.

TRIANDRIA Monogynia.

- 38 *Valeriana officinalis*
 39 — *dioica*
 40 — *montana*
 41 — *tripteris*
 42 — *pyrenaica*
 43 — *tuberosa*
 44 — *globulariæfolia*
 45 — *rabra*
 46 — *olitoria*
 47 — *auriculata*
 48 — *tridentata*
 49 *Cneorum tricoccum*
 50 *Polycnemum arvense*
 51 *Crocus vernus*
 52 — *multifidus*
 53 *Gladiolus communis*
 54 *Iris germanica*
 55 — *pseudo-acorus*
 56 — *foetidissima*
 57 — *xiphioïdes*
 58 — *tuberosa*
 59 *Cyperus fuscus*
 60 — *longus*
 61 — *flavescens*
 62 *Scirpus setaceus*
 63 — *palustris*
 64 — *pauciflores*
 65 — *caespitosus*
 66 — *lacustris*
 67 *Schoenus nigricans*
 68 — *mariscus*
 69 *Eriophorum latifolium*
 70 — *polystachyum*

TRIANDRIA Digynia.

- 71 *Phalaris* ?
 72 *Panicum verticillatum*
 73 — *viride*
 74 — *sanguinale*
 75 — *filiforme*
 76 — *crus galli*
 77 *Phleum pratense*
 78 — *alpinum*
 79 — *Gerardi*

136 BOTANY OF BAGNERES DE BIGORRE.

TRIANDRIA Digynia—(contd.)

- 80 *Phleum Boehmeri*
- 81 *Milium paradoxum*
- 82 — *effusum*
- 83 *Agrostis alba*
- 84 — *vulgaris*
- 85 — *rupestris*
- 86 — *alpina*
- 87 — *caespitosa*
- 88 — *præcox*
- 89 — *caryophylla*
- 90 — *flexuosa*
- 91 *Melica ciliata*
- 92 — *uniflora*
- 93 *Poa annua*
- 94 — *alpina*
- 95 — *cenisia*
- 96 — *bulbosa*
- 97 — *trivialis*
- 98 — *pratensis*
- 99 — *nemorosa*
- 100 — *cæsia*
- 101 — *compressa*
- 102 *Briza media*
- 103 *Cynosurus cristatus*
- 104 — *echinatus*
- 105 *Festuca myurus*
- 106 — *sciurooides*
- 107 — *ovina*
- 108 — *alpina*
- 109 — *duriuscula*
- 110 — *eschia*
- 111 — *spadicea*
- 112 — *pratensis*
- 113 — *aquatica*
- 114 — *rigida*
- 115 — *fluitans*
- 116 — *cærulea*
- 117 — *gracilis*
- 118 — *pinnata*
- 119 *Bromus erectus*
- 120 — *asper*
- 121 — *giganteus*
- 122 — *tectorum*
- 123 — *sterilis*

TRIANDRIA Digynia—(contd.)

- 124 *Bromus rubens*
- 125 *Stipa calamagrostis*
- 126 *Avena flaveecens*
- 127 — *setacea*
- 128 — *pratensis*
- 129 — *montana*
- 130 — *fatua*
- 131 — *alba*
- 132 — *elatior*
- 133 *Arundo phragmitis*
- 134 *Lolium arvense*
- 135 — *temulentum*
- 136 — *perenne*
- 137 *Hordeum mariticum*
- 138 *Triticum caninum*

TRIANDRIA Trigynia.

- 139 *Montia fontana*

CLASS 4.

TETRANDRIA Monogynia.

- 140 *Globularia cordifolia*
- 141 — *vulgaris*
- 142 — *nudicaulis*
- 143 *Scabiosa succisa*
- 144 — *sylvatica*
- 145 — *arvensis*
- 146 — *hirsuta*
- 147 — *gramuntia*
- 148 — *colombaria*
- 149 — *pyrenaica*
- 150 — *lucida*
- 151 *Sherardia arvensis*
- 152 *Asperula odorata*
- 153 — *cynanchica*
- 154 — *multiflora*
- 155 *Galium Bauhinii*
- 156 — *cruciatum*
- 157 — *palustre*
- 158 — *rotundifolium*
- 159 — *pyrenaeicum*
- 160 — *uliginosum*
- 161 — *pusillum*
- 162 — *villarsii*

TETRANDRIA Monogynia—
(continued.)

- 163 *Galium saxatile*
- 164 — *sylvestre*
- 165 — *sylvaticum*
- 166 — *aristatum*
- 167 — *verum*
- 168 *Rubia peregrina*
- 169 *Plantago coronopus*
- 170 — *major*
- 171 — *lanceolata*
- 172 — *sericea*
- 173 — *argentea*
- 174 — *alpina*
- 175 *Alchemilla arvensis*
- 176 — *vulgaris*
- 177 — *hybrida*
- 178 — *alpina*

TETRANDRIA Digynia.
 179 *Cuscuta europaea*
 180 — *epithymum*

TETRANDRIA Trigynia.
 181 *Ilex aquifolium*
 182 *Potamogeton densum*
 183 — *natans*
 184 — *crispum*
 185 — *obtusifolium*
 186 — *trichodes*
 187 *Sagina procumbens*
 188 — *apetala*
 189 — *erecta*

CLASS 5.

PENTANDRIA Monogynia.

- 190 *Borraginee*, Jussieu
- 191 *Heliotropum europeum*
- 192 *Myosotis arvensis*
- 193 — *versicolor*
- 194 — *stricta*
- 195 — *palustris*
- 196 — *sylvatica*
- 197 — *alpestris*
- 198 *Lithospermum Gastonii*

PENTANDRIA Monogynia—
(continued.)

- 199 *Lithospermum officinale*
- 200 — *prostratum*
- 201 — *arvense*
- 202 *Cynoglossum officinale*
- 203 *Pulmonaria officinale*
- 204 — *angustifolia*
- 205 *Sympyrum officinale*
- 206 — *tuberosum*
- 207 *Cerinthe alpina*
- 208 *Echium vulgare*
- 209 — *italicum*
- 210 *Aretia helvetica*
- 211 — *diapenoides*
- 212 — *frutescens*
- 213 — *alpina*
- 214 — *hirsella*
- 215 — *carnea*
- 216 — *villosa*
- 217 — *vitasiana*
- 218 *Primula veris*
- 219 — *elatior*
- 220 — *formosa*
- 221 — *auriculata*
- 222 — *viscosa*
- 223 — *integrifolia*
- 224 *Lysimachia nemorum*
- 225 *Soldanella alpina*
- 226 *Anagnostis arvensis*
- 227 — *tenella*
- 228 *Convolvulus sepium*
- 229 — *arvensis*
- 230 *Campanula longifolia*
- 231 — *glomerata*
- 232 — *trachelium*
- 233 — *rapunculoides*
- 234 — *rhomboidalis*
- 235 — *hederacea*
- 236 *Lobelia urens*
- 237 *Phyteuma spicata*
- 238 — *orbiculare*
- 239 — *hemisphaerica*
- 240 *Lonicera pyrenaica*
- 241 — *nigra*

PENTANDRIA Monogynia—

(continued.)

- 242 *Lonicera xylosteum*
 243 *alpigena*
 244 *Verbascum nigrum*
 245 — *thapsus*
 246 — *blattarioides*
 247 — *blattaria*
 248 *Ramondia pyrenaica*
 249 *Datura stramonium*
 250 *Hyoscyamus niger*
 251 *Atropa belladonna*
 252 *Solanum dulcamara*
 253 — *nigrum*
 254 *Rhamnus alaternus*
 255 — *pumilus*
 256 — *alpinus*
 257 — *frangula*
 258 *Ribes rubrum*
 259 — *uva crispa*
 260 — *alpinum*
 261 *Viola sylvestris*
 262 — *hirta*
 263 — *odorata*
 264 — *canina*
 265 — *biflora*
 266 — *cornuta*
 267 — *calcarata*
 268 — *cenisia*
 269 — *lutea*
 270 *Impatiens noli tangere*
 271 *Illecebrum polygonifolium*
 272 — *paronychia*
 273 *Thesium alpinum*
 274 *Vinca major*
 275 — *minor*

PENTANDRIA Digynia.

- 276 *Asclepias vincetoxicum*
 277 *Herniaria pyrenaica*
 278 — *alpina*
 279 *Chenopodium bonus Henricus*
 280 — *ambrosioides*

PENTANDRIA Digynia—

(continued.)

- 281 *Ulmus campestris*
 282 *Gentiana lutea*
 283 — *Burseri*
 284 — *pneumonanthe*
 285 — *acaulis*
 286 — *alpina*
 287 — *verna*
 288 — *campestris*
 289 — *nivalis*
 290 — *ciliata*
 291 *Hydrocotyle vulgaris*
 292 *Eryngium Bourgatii*
 293 — *campestre*
 294 *Scandix pecten Veneris*
 295 — *anthriscus*
 296 *Chaerophyllum sylvestre*
 297 — *aureum*
 298 *Myrrha odorata*
 299 *Pimpinella magna*
 300 — *saxifraga*
 301 *Bupleurum odontites*
 302 — *pyrenaeum*
 303 — *graminifolium*
 304 — *ranunculoides*
 305 — *falcatum*
 306 *Selinum pyrenaicum*
 307 *Ligusticum pyrenaeum*
 308 *Angelica pyrenaica*
 309 — *sylvestris*
 310 — *montana*
 311 *Meum athamanticum*

PENTANDRIA Trigynia.

- 312 *Viburnum lantana*
 313 — *opus*
 314 *Sambucus racemosa*
 315 — *ebulus*
 316 — *nigra*
 317 *Tamarix germanica*
 318 *Corrigiola littoralis*

PENTANDRIA Tetragnynia.

- 319 *Parnassia palustris*

PENTANDRIA Pentagynia.

- 320 *Statice armeria*
- 321 *Linum usitatissimum*
- 322 — *flavum*
- 323 — *radiola*
- 324 — *catharticum*
- 325 *Drosera rotundifolia*
- 326 — *longifolia*
- 327 *Sibbaldia procumbens*

CLASS 6.**HEXANDRIA Monogynia.**

- 328 *Galanthus*
- 329 *Narcissus bulbocodium*
- 330 — *pseudo-narcissus*
- 331 — *poeticus*
- 332 *Allium serotinum*
- 333 — *sphaerocephalum*
- 334 — *vineale*
- 335 — *schoenoprasum*
- 336 — *angulosum*
- 337 — *ursinum*
- 338 *Lilium pyrenaicum*
- 339 — *martagon*
- 340 *Fritillaria pyrenaica*
- 341 *Erythronium*
- 342 *Ornithogalum umbellatum*
- 343 *Scilla lilio-hyacinthus*
- 344 — *verna*
- 345 *Asphodelus albus*
- 346 *Anthericum liliago*
- 347 *Convallaria majalis*
- 348 — *verticillata*
- 349 — *polygonatum*
- 350 *Hyacinthus muscari*
- 351 — *amethystinus*
- 352 — *serotinus*
- 353 *Hemerocallis flava*
- 354 *Juncus glaucus*
- 355 — *conglomeratus*
- 356 — *filiformis*
- 357 — *trifidus*
- 358 — *supinus*

HEXANDRIA Monogynia—*(continued.)*

- 359 *Juncus Buffonius*
- 360 — *alpinus*
- 361 *Luzula sylvatica*
- 362 — *maxima*
- 363 — *spadilla*
- 364 — *glabrata*
- 365 — *spicata*
- 366 — *pediformis*
- 367 — *campestris*

HEXANDRIA Trigynia.

- 368 *Rumex acetosella*
- 369 — *acetosa*
- 370 — *scutatus*
- 371 — *alpinus*
- 372 — *hydrolapathum*

HEXANDRIA Polygynia.

- 373 *Alisma plantago*

CLASS 8.**OCTANDRIA Monogynia.**

- 374 *Epilobium angustifolium*
- 375 — *hirsutum*
- 376 — *parviflorum*
- 377 — *montanum*
- 378 — *palustre*
- 379 — *tetragonum*
- 380 — *alpinum*
- 381 *Œnothera biennis*
- 382 *Erica arborea*
- 383 — *tetralix*
- 384 — *vulgaris*
- 385 — *vagans*
- 386 — *Dobœcia*
- 387 *Daphne cneorum*
- 388 — *mezereum*
- 389 — *laureola*
- 390 *Passerina juniperifolia*

OCTANDRIA Trigynia.

- 391 *Polygonum viviparum*
- 392 — *bistorta*

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OCTANDRIA *Trigynia*—(contd.)

- 393 *Polygonum hydropiper*
- 394 — *lopathifolium*
- 395 *Paris quadrifolia*

CLASS 10.

DECANDRIA *Monogynia*.

- 396 *Monotropa hypopithys*
- 397 *Rhododendrum ferrugineum*
- 398 *Arbutus uva ursi*
- 399 *Pyrola uniflora*
- 400 — *secunda*
- 401 — *minor*

DECANDRIA *Digynia*.

- 402 *Chrysoplenium oppositifolium*
- 403 *Saxifraga oppositifolia*
- 404 — *pyramidalis*
- 405 — *longifolia*
- 406 — *aquatica*
- 407 — *capitata*
- 408 — *greenlandica*
- 409 *Sceleranthus perennis*
- 410 *Gypsophila repens*
- 411 *Saponaria elegans*
- 412 *Dianthus barbatus*
- 413 — *prolifer*
- 414 — *ameria*
- 415 — *deltoides*
- 416 — *monspeliacus*
- 417 *Silene acaulis*
- 418 — *quadrifida*
- 419 — *saxifraga*
- 420 — *ciliata*
- 421 *Stellaria nemorum*
- 422 — *cerastoides*
- 423 *Arenaria ciliata*
- 424 — *triflora*
- 425 — *grandiflora*
- 426 — *purpurascens*
- 427 — *laricifolia*
- 428 *Cherleria sedoides*

DECANDRIA *Pentagynia*.

- 429 *Cotyledon umbilicus*
- 430 *Sedum rhodiola*
- 431 — *annuum*
- 432 — *hirsutum*
- 433 — *sphaericum*
- 434 — *atratum*
- 435 *Sempervivum montanum*
- 436 — *tectorum*
- 437 — *arachnoideum*
- 438 *Oxalis acetosella*
- 439 *Lychnis alpina*
- 440 — *pyrenaica*
- 441 *Cerastium arvense*
- 442 — *alpinum*
- 443 — *lanatum*
- 444 *Spergula saginoides*

CLASS 11.

DODECANDRIA *Monogynia*.

- 445 *Lythrum salicaria*

DODECANDRIA *Digynia*.

- 446 *Agrimonia eupatorium*

DODECANDRIA *Trigynia*.

- 447 *Reseda glauca*
- 448 — *lutea*
- 449 — *sesamoides*
- 450 *Euphorbia exigua*
- 451 — *dulcis*
- 452 — *hyberna*

CLASS 12.

ICOSANDRIA *Monogynia*.

- 453 *Prunus padus*
- 454 — *avium*
- 455 — *spinosus*

ICOSANDRIA *Digynia*.

- 456 *Crataegus oxyacantha*
- 457 — *Azarolus*

ICOSANDRIA *Trigynia*.

- 458 *Sorbus aucuparia*

Icosandria Pentagynia.

- 459 *Mespilus Cotoneaster*
- 460 — *chamaemespilus*
- 461 — *amelanchier*
- 462 *Spiraea aruncus*
- 463 — *ulmaria*

Icosandria Polygynia.

- 464 *Rosa alpina*
- 465 — *pyrenaica*
- 466 — *canina*
- 467 — *montana*
- 468 — *glandulosa*
- 469 *Rubus vulgaris*
- 470 — *caesius*
- 471 — *ideus*
- 472 *Fragaria vesca*
- 473 *Potentilla minima*
- 474 — *reptens*
- 475 — *verna*
- 476 — *anserina*
- 477 — *fruticosa*
- 478 — *fragariastrum*
- 479 — *micrantha*
- 480 — *Vaillantii*
- 481 — *alchemilloides*
- 482 — *nivalis*
- 483 *Geum montanum*
- 484 — *pyrenaicum*
- 485 — *nivale*
- 486 — *urbanum*
- 487 *Dryas octopetala*

CLASS 13.

Polyandria Monogynia.

- 488 *Chalcedonium majus*
- 489 *Papaver pyrenaicum*
- 490 — *argemone*
- 491 — *dubium*
- 492 — *cambricum*
- 493 *Nymphaea lutea*
- 494 — *alba*
- 495 *Tilia europaea*
- 496 — *parviflora*
- 497 *Cistus incanus*

Polyandria Monogynia—

(continued.)

- 498 *Helianthemum guttatum*
- 499 — *piloselloides*
- 500 — *pilosum*
- 501 — *fumaria*
- 502 — *vulgare*
- 503 — *grandiflorum*

Polyandria Trigynia.

- 504 *Delphinium consolida*
- 505 *Aconitum anthora*
- 506 — *napellus*
- 507 — *pyrenaicum*

Polyandria Pentagynia.

- 508 *Aquilegia vulgaris*
- 509 — *pyrenaica*
- 510 — *alpina*

Polyandria Polygynia

- 511 *Anemone hepatica*
- 512 — *vernalis*
- 513 — *alpina*
- 514 — *nemorosa*
- 515 — *narcissiflora*
- 516 — *ranunculoides*
- 517 *Clematis vitalba*
- 518 *Thalictrum aquilegifolium*
- 519 — *fœtidum*
- 520 — *minus*
- 521 — *monocarpon*
- 522 *Ranunculus hederaceus*
- 523 — *thora*
- 524 — *aquatilis*
- 525 — *rutæfolius*
- 526 — *glacialis*
- 527 — *alpestris*
- 528 — *aconitifolius*
- 529 — *pyreneus*
- 530 — *graminifolius*
- 531 — *parnassifolius*
- 532 — *flammmula*
- 533 — *montanus*
- 534 — *Gouani*
- 535 — *acris*
- 536 — *lanuginosus*

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POLYANDRIA Polygynia—
(continued.)

- 537 *Ranunculus bulbosus*
- 538 — *ficaria*
- 539 *Trollius europaeus*
- 640 *Caltha palustris*
- 541 *Helleborus niger*
- 542 — *festidus*
- 543 — *viridis*

CLASS 14.

DIDYNAMIA Gymnospermia.

- 544 *Mentha arvensis*
- 545 — *sativa*
- 546 — *aquatica*
- 547 — *rotundifolia*
- 548 — *sylvestris*
- 549 *Thymus vulgaris*
- 550 — *serpyllum*
- 551 *Origanum vulgare*
- 552 *Satureia montana*
- 553 *Melissa grandiflora*
- 554 — *calamintha*
- 555 — *alpina*
- 556 *Clinopodium vulgare*
- 557 *Lamium purpureum*
- 558 — *maculatum*
- 559 — *album*
- 560 — *amplexicaule*
- 561 — *galeobdolon*
- 562 *Galeopsis ladanum*
- 563 — *tetrahit*
- 564 *Betonica officinalis*
- 565 — *alopecuros*
- 566 *Stachys annua*
- 567 — *recta*
- 568 — *alpina*
- 569 *Ballota nigra*
- 570 *Marrubium vulgare*
- 571 *Prunella vulgaris*
- 572 — *grandiflora*
- 573 *Scutellaria alpina*
- 574 — *galeruculata*
- 575 — *minor*

DIDYNAMIA Gymnospermia—
(continued.)

- 576 *Ajuga pyramidalis*
- 577 — *repans*
- 578 *Teucrium scorodonia*
- 579 — *chamaedrys*
- 580 — *pyrenaicum*
- 581 — *pseudo-chamaedrys*

DIDYNAMIA Angiospermia.

- 582 *Bartsia alpina*
- 583 — *spicata*
- 584 *Rhinanthus crista galli*
- 585 — *minor*
- 586 *Euphrasia officinalis*
- 587 — *minima*
- 588 — *odontites*
- 589 *Melampyrum pratense*
- 590 *Pedicularis verticillata*
- 591 — *pyrenaica*
- 592 — *rostrata*
- 593 — *palustris*
- 594 — *foliosa*
- 595 *Antirrhinum majus*
- 596 — *sempervirens*
- 597 — *orontium*
- 598 — *organifolium*
- 599 — *genistifolium*
- 600 — *minor*
- 601 — *arvensis*
- 602 — *alpinum*
- 603 *Scrophularia nodosa*
- 604 — *aquatica*
- 605 — *glandulosa*
- 606 — *canina*
- 607 — *vernalis*
- 608 *Digitalis purpurea*
- 609 — *lutea*
- 610 *Erinus alpinus*
- 611 *Orobanche hedera*

CLASS 15.

TETRADYNAMIA Siliculosa.

- 612 *Cochlearia saxatilis*
- 613 — *officinalis*

TETRADYNAMIA Siliculosa—
(continued.)

- 614 *Alyssum calycinum*
 615 *Draba verna*
 616 — *incana*
 617 — *stellata*
 618 — *aizoides*
 619 *Lepidium alpinum*
 620 *Thlaspi alpestre*
 621 — *heterophyllum*
 622 — *arvense*
 623 *Iberis carnosa*
 624 — *amarata*
 625 — *logascana?*
 626 — *garrexiana*
 627 *Biscutella laevigata*
 628 *Raphanus raphanistrum*

TETRADYNAMIA Siliquosa.

- 629 *Brassica eruca*
 630 — *rapa*
 631 — *napus*
 632 — *praecox*
 633 *Sinapis nigra*
 634 — *arvensis*
 635 ! !
 636 *Sisymbrium officinalis*
 637 — *acutangulum*
 638 — *pinnatifidum*
 639 *Erysimum lanceolatum*
 640 — *ochroleucum*
 641 *Alecaria officinalis*
 642 *Barbarea vulgaris*
 643 — *praecox*
 644 *Turritis glabra*
 645 *Arabis alpina*
 646 — *hirsuta*
 647 — *ciliata*
 648 — *pumila*
 649 — *bellidifolia*
 650 *Dentaria digitata*
 651 *Cardamine pratensis*
 652 — *hirsuta*
 653 — *impatiens*
 654 — *parviflora*
 655 — *latifolia*

TETRADYNAMIA Siliquosa—
(continued.)

- 656 *Cardamine resedifolia*
 657 *Nasturtium officinale*
 658 — *pyrenaicum*

CLASS 16.

MONADELPHIA Pentandria.

- 659 *Erodium pimpinellifolium*

MONADELPHIA Decandria.

- 660 *Geranium sanguineum*
 661 — *cinerum*
 662 — *phaeum*
 663 — *sylvaticum*
 664 — *pyrenaicum*
 665 — *molle*
 666 — *rotundifolium*
 667 — *pusillum*
 668 — *dissectum*
 669 *Althaea hirsuta*
 670 *Malva vulgaris*
 671 — *rotundifolia*
 672 — *moschata*

CLASS 17.

DIADELPHIA Hexandria.

- 673 *Fumaria officinalis*
 674 — *spicata*

DIADELPH A Octandria.

- 675 *Polygala amara*
 676 — *vulgaris*
 677 — *serpyllacea*

DIADELPHIA Decandria.

- 678 *Ulex nanus*
 679 — *europaeus*
 680 *Spartium scorarium*
 681 *Genista sagittalis*
 682 — *tinctoria*
 683 — *prostrata*
 684 — *pilosa*
 685 — *germanica*
 686 — *anglica*

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DIADELPHIA Decandria —

(continued.)

- 687 *Cytisus laburnum*
- 688 — *capitatus*
- 689 *Ononis spinosa*
- 690 — *rotundifolia*
- 691 — *striata*
- 692 — *minutissima*
- 693 *Anthyllis vulneraria*
- 694 — *vulnerarioides*
- 695 — *montana*
- 696 *Medicago lupulina*
- 697 — *suffruticosa*
- 698 — *muricata*
- 699 — *ciliaris*
- 700 *Trifolium fragiferum*
- 701 — *subterraneum*
- 702 — *striatum*
- 703 — *scabrum*
- 704 — *arvense*
- 705 — *ochroleucum*
- 706 — *angustifolium*
- 707 — *incarnatum*
- 708 — *alpinum*
- 709 — *repens*
- 710 — *filiforme*
- 711 — *agrarium*
- 712 — *spadicum*
- 713 *Lotus corniculatus*
- 714 — *uliginosus*
- 715 — *siliquosus*
- 716 *Oxytropis montana*
- 717 — *campestris*
- 718 — *uralensis*
- 719 *Astragalus aristatus*
- 720 — *monspessulanus*
- 721 *Coronilla* ?
- 722 *Ornithopus* ?
- 723 *Ervum gracile*
- 724 — *tetrasperma*
- 725 — *hirsutum*
- 726 *Vicia cassubica*
- 727 — *orobus*
- 728 — *atropurpurea*
- 729 — *lutea*
- 730 — *pyrenaica*

DIADELPHIA Decandria —

(continued.)

- 731 *Vicia sativa*
- 732 — *sepium*
- 733 *Lathyrus aphaca*
- 734 — *hirsutus*
- 735 — *pratensis*
- 736 — *setifolius*
- 737 *Orobus luteus*
- 738 — *niger*
- 739 — *tuberosus*

CLASS 18.

POLYDELPHIA Polyandria.

- 740 *Hypericum quadrangulare*
- 741 — *tetrapetalum*
- 742 — *androsænum*
- 743 — *nummularium*
- 744 — *pulchrum*
- 745 — *Richeri*
- 746 — *montanum*
- 747 — *humifusum*

CLASS 19.

SYNGENESIA Polygam. Equal.

- 748 *Tragopogon pratensis*
- 749 *Scorzoneroides plantaginea*
- 750 *Sonchus plumieri*
- 751 — *arvensis*
- 752 *Chondrilla juncea*
- 753 *Prenanthes purpurea*
- 754 — *muralis*
- 755 *Leontodon autumnalis*
- 756 — *alpinum*
- 757 *Trinia hispida*
- 758 *Picris hieracioides*
- 759 *Hieracium alpinum*
- 760 — *cerinthoides*
- 761 — *villosum*
- 762 — *paludosum*
- 763 — *murorum*
- 764 — *pilosella*
- 765 — *rhomboidale*

SYNGENESIA Polygam. Equal.
(continued.)

- 766 *Hieracium pumilum*
- 767 *Pieridium albidum*
- 768 *Crepis Dioscordis*
- 769 — *virens*
- 770 — *tectorum*
- 771 *Hypochaeris radicata*
- 772 *Lapsana communis*
- 773 — *minima*
- 774 *Serratula tinctoria*
- 775 *Carduus carlinoides*
- 776 — *carlinæfolius*
- 777 — *acanthoides*
- 778 *Arctium palustre*
- 779 — *lanciolatum*
- 780 — *pyrenaicum*
- 781 — *eryphorum*
- 782 — *arvense*
- 783 — *glabrum*
- 784 *Eupatorium cannabinum*
- 785 *Bidens cornua*
- 786 — *tripartita*

SYNGENESIA Polygam. Superfl.

- 787 *Artemisia mutellina*
- 788 *Gnaphalium luteo-album*
- 789 — *fuscum*
- 790 — *sylvaticum*
- 791 — *dioicum*
- 792 — *leontopodium*
- 793 *Felago germanica*
- 794 *Erigeron graveolens*
- 795 — *alpinum*
- 796 — *acre*
- 797 *Tussilago alpina*
- 798 — *farfara*
- 799 *Senecio vulgaris*
- 800 — *viscosus*
- 801 — *jacobaea*
- 802 — *Tournefortii*
- 803 — *doronicum*
- 804 — *artemisiæfolius*
- 805 *Solidago virgaurea*
- 806 *Cineraria campestris*
- 807 *Arnica montana*

SYNGENESIA Polygam. Superfl.
(continued.)

- 808 *Arnica scorpioides*
- 809 *Doronicum pardalianches*
- 810 *Bellis perennis*
- 811 *Chrysanthemum grandiflorum*
- 812 — *leucanthemum*
- 813 — *montanum*
- 814 — *alpinum*
- 815 — *coronarium*
- 816 — *corymbosum*
- 817 — *inodorum*
- 818 *Anthemis mixta*
- 819 — *nobilis*
- 820 — *arvensis*
- 821 — *montana*

SYNGENESIA Polygam. Frust.

- 822 *Centaura jacea*
- 823 — *nigrescens*
- 824 — *nigra*
- 825 — *cyanus*
- 826 — *montana*
- 827 — *scabiosa*
- 828 — *calcitrata*

CLASS 20.

GYNANDRIA Monandria.

- 829 *Orchis bifolia*
- 830 — *pyramidalis*
- 831 — *ustulata*
- 832 — *variegata*
- 833 — *fusca*
- 834 — *mascula*
- 835 — *laxiflora*
- 836 — *morio*
- 837 — *sambucina*
- 838 — *latifolia*
- 839 — *maculata*
- 840 — *conopsea*
- 841 — *viridis*
- 842 — *albida*
- 843 — *apifera?*

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GYNANDRIA Monandria—

(continued.)

- 844 *Orechis arachnitis*
- 845 *Serapias lingua*
- 846 *Epipactis rubra*
- 847 — *latifolia*
- 848 — *palustris*
- 849 — *nidus avis*
- 850 *Spiranthes autumnalis*

GYNANDRIA Hexandria.

- 851 *Aristolochia rotunda*

CLASS 21.

MONŒCIA Monandria.

- 852 *Chara vulgaris*

MONŒCIA Diandria.

- 853 *Lemna minor*

MONŒCIA Triandria.

- 854 *Sparganium ramosum*
- 855 *Carex natans*
- 856 — *davalliana*
- 857 — *pulicaris*
- 858 — *divulsa*
- 859 — *muricata*
- 860 — *paniculata*
- 861 — *stellata*
- 862 — *elongata*
- 863 — *brizoides*
- 864 — *saxatilis*
- 865 — *pyrenaica*
- 866 — *curvula*
- 867 — *nigra*
- 868 — *atrata*
- 869 — *flava*
- 870 — *pallescens*
- 871 — *aderi?*
- 872 — *sempervirens*
- 873 — *distans*
- 874 — *frigida*
- 875 — *sylvatica*
- 876 — *ampullacea*
- 877 — *præcox*
- 878 — *montana*

MONŒCIA Triandria—(contd.)

- 879 *Carex pilulifera*
- 880 — *gynobasis*
- 881 — *humilis*
- 882 — *digitata*
- 883 — *glaucia*
- 884 — *filiformis*
- 885 — *hirta*

MONŒCIA Tetrandria.

- 886 *Littorella lacustris*
- 887 *Alnus glutinosa*
- 888 *Buxus sempervirens*
- 889 *Urtica urens*
- 890 — *dioica*

MONŒCIA Pentandria.

- 891 *Xanthium strumarium*
- 892 *Amaranthus blitum*
- 893 — *prostratus*
- 894 — *retroflexus*

MONŒCIA Polyandria.

- 895 *Myriophyllum spicatum*
- 896 *Sagittaria sagittifolia*
- 897 *Poterium sanguisorba*
- 898 *Quercus pedunculata*
- 899 — *robur*
- 900 — *pubescens*
- 901 — *tza*
- 902 — *suber*
- 903 *Fagus sylvatica*
- 904 *Castanea vulgaris*
- 905 *Betula alba*
- 906 — *pubescens*
- 907 *Carpinus betulus*
- 908 *Corylus avellana*
- 909 *Arum maculatum*
- 910 — *italicum*

MONŒCIA Monadelphia.

- 911 *Pinus sylvestris*
- 912 — *mugho*
- 913 — *pectinata*
- 914 *Abies excelsa*
- 915 — *picea*
- 916 *Bryonia dioica*

CLASS 22.

DIGECKIA Dianandra.

- 917 *Salix retusa*
 918 — *reticulata*
 919 — *pyrenaica*
 920 — *caprea*
 921 — *rubra*
 922 — *purpurea*
 923 — *triandria*

DIGECKIA Triandria.

- 924 *Empetrum nigrum*

DIGECKIA Tetrandra.

- 925 *Viscum album*

DIGECKIA Pentandra.

- 926 *Humulus lupulus*

DIGECKIA Hexandra.

- 927 *Tamus communis*

DIGECKIA Octandra.

- 928 *Populus tremula*
 929 — *fastigiata*
 930 *Rhodiola rosea*

DIGECKIA Enneandra.

- 931 *Mercurialis perennis*
 932 — *annua*

DIGECKIA Monadelphia.

- 933 *Juniperus communis*
 934 — *sabina*
 935 *Taxus baccata*
 936 *Ruscus aculeatus*

CLASS 23.

POLYGAMIA Monæcia.

- 937 *Holcus mollis*
 938 — *lanatus*

- 939 *Parietaria officinalis*

- 940 *Atriplex latifolia*

POLYGAMIA Dicæia

- 941 *Fraxinus excelsior*

CLASS 24.

CRYPTOGAMIA.

- 942 *Equisetum arvense*
 943 — *fluvatile*
 944 — *palustre*
 945 — *limosum*
 946 — *hyemale*
 947 *Ophioglossum vulgatum*
 948 *Botrychium lunaria*
 949 *Osmunda regalis*
 950 *Ceterach officinarum?*
 951 *Polypodium vulgare*
 952 — *phaeopteris*
 953 — *dryopteris*
 954 *Aspidium oreopteris*
 955 — *thelypteris*
 956 — *filix-mas*
 957 — *aculeatum*
 958 — *fragile*
 959 — *rhaeticum*
 960 — *alpinum*
 961 — *filix-fœmina*
 962 *Asplenium fontanum*
 963 — *adiantum-nigrum*
 964 — *ruta-muraria*
 965 — *septentrionale*
 966 — *viride*
 967 — *trichomanes*
 968 *Scolopendrium officinale*
 969 *Pteris aquilina*
 970 — *crispa*
 971 *Blechnum spicans*
 972 *Adiantum capillus Venoris*

Mosses and lichens abound in great variety in the Pyrénées, but have not yet been classified or minutely described. The Author is in possession of a description and classification of a very considerable number of them; but it is too extensive a subject to enter upon in a condensed or cursory manner. The amateur will find, in this field of the cryptogamia, most ample means of gratifying his inquisitive taste, since he will meet with many specimens altogether peculiar to the Pyrénées.

CHAPTER X.

SOME CURSORY NOTICES OF THE NATURAL HISTORY OF THE PYRENEES. BIRDS AND BEASTS OF CHASE. ENUMERATION OF SOME INSECTS FOUND IN THE NEIGHBOURHOOD OF THE WATERING-PLACES. THE CHASSE OF THE COQ DE BRUYERE, IZZARD, BEAR, WOLF, AND IBEX.

IT would be a superfluous undertaking to give a minute description or even catalogue of the animals which permanently reside in, or occasionally and periodically visit the Pyrénées, since, with the exception of those met with beyond the regions habitable by man, and which, like the plants, become more rare as we approach the lofty summits of the chain, they are those common to most mountainous vicinities, and corresponding points of medium elevation. With regard to the beasts and birds, we shall confine our remarks to such as are peculiar to the most untrodden beats of the Pyrénées; where the natural antipathy betwixt the lower creatures and their ruler man, has taught them to choose the most difficult solitudes for indulging an uninterrupted freedom—a necessity of their natures, and to such, therefore, chiefly, as become the subjects of the chase.

After leaving behind us the last habitations of the mountaineers, as we make the painful ascent up some of the stubborn chains, the zoologist soon

finds himself in regions altogether unsuitable to and unacquainted with the tamer animals of the plains; heights, where the eagle and the barbed vulture, secure in their despotism, view far beneath them in the middle air, their victims of prey, ambitiously courting aërial honours, and in their soaring flight gradually approaching their destruction. And here the wolves rarely, but the bears more frequently, establish their lurking-places. These animals, less ferocious than those of the Alps, cause, however, frequent inquietude to the shepherd. Nevertheless, the hardy mountaineers follow them even to their dens, and attack them with fire arms; or wrapped up in triple sheepskins, and armed with long knives, hesitate not to meet them front to front.

A chase less perilous, but more fatiguing, over the perpetual snows, is that of the izzard,—the chamois of the Pyrénées,—of the ibex, still more scarce and shy, and of the coq de bruyère, although in regions less elevated, still most difficult for the sportsman, midst the intricacies and broken precipices of *pics* thickly clothed with pine.

We find, in the higher regions of the mountains, the following specimens of animals:—the wolf, bear, and izzard. The lynx, wild boar, roebuck, and wild cat, although at one time found in great numbers, are now extremely scarce; and the stag, according to Buffon, has been unknown for more than two hundred years. In the western part of the Py-

rénées, pine martens, ermines, and the Virginian squirrel, prized for their skins, are still to be met with in considerable numbers. There is an animal also in these mountains called by the peasants the *loup terrier*, which seems to be undescribed; at least it is difficult to identify it with any notice in works of natural history. None of the mountain *ciceroni* that we have met with, had ever seen one alive, but they described the animal to be larger than a fox, of a light fawn colour, and burrowing in the ground, harmless, and living on roots; rather a mysterious sort of animal certainly, which, something like the water-kelpies of Scotland, has rather an abstract kind of existence.

On the inaccessible *pics* the eagles and vultures, and the coq de bruyère (the capercailzie of Scotland) in less elevated regions, take up their abodes; while the tomtit of the Alps skips among the precipices, the rock-blackbird blends its song with the current of the torrents, and the wall-pecker glides along the abrupt declivities. The ptarmigan is plentiful everywhere, as is also the mountain partridge, and bustards are said to be found on the elevated plains, while ravens and daws in abundance accompany the flocks of sheep in their pastoral wanderings. Some of the Pyrenean birds are in great request among strangers who frequent the watering places. The wood pigeons and stock doves, although very common, are not the less in estimation. As autumn

advances, and the trees become despoiled of their leaves, these birds of passage, migrating from the north, and traversing the gorges on the less elevated parts of the mountains, in search of a milder temperature, are caught in great numbers, in nets into which they are artfully decoyed—a sport more particularly described in a subsequent chapter on Bagnères de Bigorre, where it is practised on a large scale. Quails, cranes, and wild geese are also very numerous at the season of migration.

We subjoin a short enumeration of some of the insects found on the mountains in the neighbourhood of the watering-places.

- 1 *Cymindis humeralis*; alpine region, under the stones.
- 2 *Clivina arenaria*; borders of torrents, under the stones.
- 3 —— *gibba*; found in various situations.
- 4 *Carabus splendens*; subalpine region.
- 5 —— *purpurescens*; in various situations.
- 6 —— *catenulatus*; ditto common.
- 7 —— *convexus*; ditto more rare.
- 8 —— *hortensis*; ditto common
- 9 —— *pyrenaeus*; alpine region; it does not quit the alpine zone; rather common.
- 10 *Calosoma sericeum*; most rare.
- 11 *Nebria picicornis*; borders of the torrents.
- 12 —— *jokischii*; alpine region, rare.
- 13 —— *lafrenayei*; more common.
- 14 *Leistus nitidus*; borders of the torrents, rare.
- 15 *Licinus silphoides*; Eaux-Bonnes, rare.
- 16 *Badister bipustulatus*; ditto, rare.
- 17 *Chlaenius velutinus*; borders of the torrents, rare.
- 18 —— *vestitus*; ditto rare.
- 19 —— *tibialis*; ditto rare.

- 20 *Amara montana*; alpine region, rare.
- 21 *Anchomenus cyaneus*; borders of the torrents, beautiful and rare specimen.
- 22 *Calathus frigidus*; subalpine region.
- 23 —— *melanocephalus*; ditto.
- 24 *Argutor abaxoidee*; alpine region, not rare.
- 25 —— *pusillus*; ditto more rare.
- 26 *Pæcilius lepidus*; valley d'Ossau.
- 27 *Platysma nigra*; Balour, Eaux-Bonnes.
- 28 *Pristonychus pyrenæus*; alpine region, pic de Gers, very rare.
- 29 *Pterostichus parumpunctatus*.
- 30 —— *Dufouri*; rare.
- 31 *Abax striola*; Eaux-Bonnes.
- 32 *Steropus concinnus*; ditto.
- 33 *Zabrus abesus*; alpine region, Gers, common.
- 34 *Harpalus conformis*; Eaux Bonnes.
- 35 —— *semiviolaceus*; ditto, &c.
- 36 —— *serripes*; ditto.
- 37 *Bembidium striatum*; borders of the torrents.
- 38 *Peryphus tricolor*; ditto.
- 39 —— *decorus*; ditto.
- 40 —— *coruleus*; ditto.
- 41 —— *femoratus*; ditto.
- 42 —— *rufipes*; ditto.
- 43 *Lopha 4 guttata*; ditto.
- 44 —— *4 maculata*; ditto.
- 45 *Omophron limbatum*; ditto.
- 46 *Lesteva dichroa*; ditto, rare.
- 47 *Lychus minutus*;
- 48 *Rhysodes erupeæus*; in old rotten fir stumps, rare insect not discovered in France till 1828, by M. Dufour.
- 49 *Necrophorus mortuorum*; rare.
- 50 *Sylpha atrata*; under the bark of the fir tree.
- 51 —— *thoracica*.
- 52 *Peltia grossa*; under the bark of the fir tree.
- 53 —— *ferruginea*; ditto.
- 54 *Thymalus lymbatus*; under the bark of the fir tree.

- 55 *Byrrhus pyrenaeus*; under the stones.
 56 *Synodendrum cylindricum*.
 57 *Hypophlaeus castaneus*.
 58 ——— *bicolor*.
 59 *Diaperis boleti*.
 60 ——— *violacea*.
 61 *Boletophagus crenatus*.
 62 ——— *spinosulus*; bark of the beech tree.
 63 *Melandria serrata*; ditto.
 64 *Anthribus albinus*; ditto.
 65 ——— *latirostris*; ditto.
 66 *Liparus glabratus*; under the stones.
 67 *Pachygaster navarricus*; ditto.
 68 ——— *monticola*.
 69 *Callichroma alpina*; old beech trees.
 70 *Chrysomela gloriosa*; the plants.
 71 ——— *cacaliæ*.
 72 ——— *phalerata*.
 73 ——— *pyritosa*; meadows.
 74 ——— *aucta*; ditto.

We now proceed to give a short description of the chase of the izzard, bear, wolf, ibex, and coq de bruyère, which, independently of the healthy excitement inseparable from such a pursuit, affords to the tourist the occasion for beholding the grandest specimens of hitherto little-explored scenery; and here we cannot avoid recording our obligations to a sporting friend, who has favoured us with notes, containing some details of two or three successful expeditions, in the usual and difficult haunts of these animals.

With regard to the izzard.—This animal may, we think, be identified with the chamois of the Alps.

(*Antilope rupricapra*, LINN.) The objections usually made to their being the same animal, are the difference of size, of colour, different position of the horns, and the fact that they are seen in large herds in the Pyrénées. The first distinction is owing to nothing but difference of climate and food; the second is refuted by Coxe (*Voyage en Suisse*, 29th Letter); the third is entitled to little weight, as on comparison, very little difference can be detected; the fourth objection is refuted by Coxe, and even allowing it to be true, is met by the answer that the chamois is more hunted than the izzard.

Through the whole of the Pyrénées, the izzard is to be found on the higher mountains. At Bagnères de Bigorre, the race is extinct (although a *chasseur* lately encountered an old gentleman on the Salut road, who gravely asserted that three cows on the Bedat were izzards). Inglis mentions having seen either one or two on the Pic de Midi, but this has reference to some years ago, and the natives say that there are none now to be met with. In the neighbourhood of Barrèges also, they are becoming scarce. We should say that Cauterets, in the Hautes Pyrénées, and the valley of the Eaux-Chaudes, and the mountains intervening between these two, are the best hunting quarters within a pleasant distance of Pau. Givors, in the Arriége, and Bagnères de Luchon, are both excellent quarters, but so far from Pau as to put an expedition out of the question.

To hunt with success, we must avoid undertaking the chase with the *vent d'Espagne* or south wind blowing; for however numerous the izzards may be, the sportsman will find it impossible to surround them.

The nearest hunting quarters to Pau are by the Eaux-Chaudes, twenty-five miles distant; a few miles beyond this place, most magnificent scenery brings us to Gabbas, the last French town on the frontier. We have now arrived at the meridian of the hunting ground. Before leaving the Eaux-Chaudes (a watering place to be afterwards more minutely described), it will be necessary to engage guides. The following are persons whose honesty, care, and knowledge of the ground may be depended upon, viz., Jean Biraben *dit* Jean Dô^e of Laruns, a small town three miles from the Eaux-Chaudes, on the Pau road; Bertrand Bergada, of the Eaux-Chaudes (*dit* Bertrand le Baigneur), and Camy, likewise of the same place. In addition to these, when more men are required, Vignau of Laruns (an excellent sportsman and first-rate shot), and Barron of Gouste, may be depended on, as honest, hard-working men, and good at hill-work. Bertrand Bergada, being the bather, cannot accompany parties on the hill in summer, as this is the season for taking the waters; in autumn, winter, or spring, he is at liberty.

There are two methods of hunting the izzard.

One is the *stalking*, which, owing to the nature of the ground, is intensely difficult as well as fatiguing, and of course is doubly uncertain. The advantage is, that one gets an easy steady shot. It is practised like *deer-stalking*, which is now understood throughout England, since Scrope published his admirable work ; therefore, more need not be said of it here.

The other system is that of posting the shooters and driving the izzards. For this, Jean Dôt, Bertrand, or Vignau, are indispensably necessary, from their minute knowledge of the intricacies of the ground, and the habits of the animals ; for they alone know the places where the izzards are accustomed to pass. Jean Dôt was the inventor of this system, which he has now reduced to such a certainty, that it is next to a miracle to return home without getting at least one shot ; we do not mean bringing home an izzard, for it is a very hard-lived animal, and if not killed on the spot, is very apt to get off, however severely wounded. We have known of several lost in this way, which must have died within a minute or two at most after the shot ; but once out of sight, they must be given up as lost. For this reason a lurcher (greyhound and terrier cross), which would remain silent while not running, and give tongue while running, would be invaluable as an auxiliary to a keen sportsman, who dislikes that good game should feed the eagles, vultures, wolves, ravens, and other vermin of the mountains. No-

thing can be more exciting than this diversion ; the shouting of the beaters, the echoing of their guns, and a natural state of nervous anxiety, frequently cause a young amateur to miss his first shot, however practised he may be in other kinds of sport.

The usual plan is to take a light breakfast before leaving the Eaux-Chaudes (always supposing that the expedition is undertaken in autumn, winter, or spring). The sportsman should proceed leisurely to the *beat* if he has time, for a strain up-hill is a sad shaker of nerves. The shooters are posted, and, according to the nature of the beat, have to wait motionless a longer or shorter time, until they hear the first shot of the beaters, or *traqueurs*, as they are technically called. But if the beat is a long or difficult one, a considerable time may elapse between the first shot and the arrival of the game. Rarely do the izzards make their rush at once; generally they stop to listen to the *traqueurs*, and only pass the posts, when they are closely pressed upon from behind.

The numbers seen in one day vary very much. We have known *in one beat*, nine pass a post, within shot; while out of range, on neighbouring and loftier mountains, as many as eighty have been counted with the aid of a telescope.

After the beat is over, a comfortable place is chosen for the dinner, usually the shade of some splendid pine tree. If the weather is cold, a fire is

lighted ; the provisions are brought out, and under the influence of the keen mountain air, much justice is done to the fare, however homely. The izzards, if any have been killed, are *gralloched*, to use the Highlander's term, and all the party enjoy themselves as best they can.

In the early part of autumn, there are many places where two *beats* can be made in one day. In winter, it is hardly possible to make more than one. A friend, however, made two in February, 1841 ; but the reason was that he had been unsuccessful, and was anxious to make amends for previous bad luck. The labour is not great for the shooters, but the *traqueurs* have most severe toil, as may easily be seen when they come in from their beat. For this reason, the dinner is usually the conclusion of the day's sport.

In summer, the best manner of reaching the haunts of the izzard, which are then much higher up the mountains, is to start over-night, providing oneself with a blanket, and to sleep either in a shepherd's hut, or in some sheltered place, and to commence the beat at daybreak. The advantages of summer shooting are—the greater chances of game, more settled weather, and, from this latter circumstance, the power of staying several days on the hills, if the sport is found to be good. The advantages of the autumn and winter shooting are—that the izzards are in their greatest beauty, and low

down on the hills; the heat is not intense as in summer, and there is choice of rooms at the hotel of the Eaux-Chaudes, without being troubled either by the drinkers of the waters, or by would-be sportsmen, who distress the echoes with hunting horns, French horns, and other noisy abominations.

The izzard weighs on an average from forty-five to fifty-five French pounds. The male is found sometimes of the weight of sixty pounds, and the female of fifty pounds. Both these weights are, however, rare. In winter the male turns nearly black; but no fixed colour can be given to them, as we have seen several skins, each entirely different from the other.

And now as to the more rare *chasse* of the ibex. The ibex, bouquetin, cabra de montes, bucardo, or *Capra ibex*, is the largest and rarest game of the Pyrénées. Tradition says that it was formerly plentiful; now it is certainly *most rare*, and can only be found in the wild recesses of the Val de Broto, in Spain, or in the still wilder solitudes of the Maladetta. We recommend the Val de Broto for the sport, as, from the experience of successful *chasseurs*, bouquetins are to be found there; and because the work is not so severe, the shelter better, and the distance from Pau or Bagnères de Bigorre, less.

The season for this hunt is the month of May. As soon as the mountains can be crossed, we would suggest to any person wishing to enjoy this sport, to

start for the Eaux-Chaudes. There he will find guides who can conduct him during his two days' journey through the mountains. The same persons as those recommended for the izzard hunting are fully capable of guiding the stranger through this more difficult and devious route.

At Gabbas, the road through the forest to the left is taken. This leads to the Casa de Broussete, which place (the last French house) is situated at the end of a most lovely valley, surrounded by pine forests, mountains, rocks, &c. The sportsman then strikes up the mountain side to the pass of Pe du Lu. The ascent is severe, but not dangerous, if the guide be carefully followed, without attempting a short cut of any kind. The real danger is in the gorge of the pass, which is always chilly and the wind cutting, and till the month of August many feet deep in snow. The descent to Jallens (the first Spanish village) is only difficult in one part, where it is advisable to dismount. The place we would recommend to travellers to rest the first night is Penticosa, so famed for its mineral springs, at the house of Don Jose Juan Torla, who, *for a consideration*, lodges one well, and in a *clean room*. It will be well to start early next morning, and breakfast at Briescas, not at the Posada, but at the house immediately opposite to it, which is clean to a nicety, and whose owner is most hospitable to the English. He almost adores the Duke of Wellington, "el Liberador de la España," as he called him.

The road from Penticosa to Briescas is down the pass of St. Helena, one of the most beautiful mountain passes in the Pyrénées or elsewhere. The road is close on the banks of the river Gallego, which in fact once crosses twice in the pass. The botany of this part of the road is very fine; the large saxifrage is constantly occurring, with its pyramid of flowers two feet in height; and the beautiful Raymundia pyrenealis, with its purple and yellow flowers, grows in every nook in the rocks.

At Briescas, the sportsman leaves the valley of the Gallego, and turns to the left up a wide glen to the Col de Fablo, which must be crossed (and no easy matter is it). From the top of this, the view is most magnificent, looking down into the valley of Gesero. We then pass through the villages of Gesero, Linces, Broto, and Threco, and find ourselves in the Val de Broto, and turning to the left, a short hour's trot brings us to Torla. The best house here is that of the Intendente de la Duana; he is father-in-law to Don Jose Juan Torla, and will accommodate travellers with clean beds, &c., but at an extortionate price. This is the worst fault of Spain, for you cannot bargain, and *must* pay, or "cuchillo entones" is the word.

The bouquetin can be found within an hour's walk of Torla; and now, having brought the sportsman to the ground, we shall give some description of the game.

The ibex is of a dark brown colour on the back

and sides, and white underneath. The male has a black beard, and his horns are much larger and thicker than those of the female. We have seen the buck's horns more than two feet in length. It is rare to find the male's horns perfect at the point, either from fighting, or from a habit *they are said* to have of throwing themselves over precipices and *keeping themselves* on their horns. The hair of the ibex is short; in winter they have a thick undercoat of fine wool. A friend killed one which weighed, when cleaned out, forty-seven Spanish pounds of thirty-six ounces each; so that we may estimate the male at from fifty-five to sixty pounds weight—the male being a giant in proportion to the female. The male ibex is of a redder brown than the female, and has a ridge of blackish bristles along the back bone.

In the winter the ibex comes down into the valleys to feed, but in summer it returns to the wildest parts of the mountains. The Swiss say that an old buck will attack the hunter: the Spaniards deny it. At all events it is always better to be fore-armed; a *couteau de chasse* is a good ally, whether for *grallocking* the game, or defending oneself against a too affectionate *liaison* with some stray ill-conditioned bear.

The general food of the ibex, as far as can be learned, is supposed to be the young sprouts of the pine and fir trees during the winter and spring; in

summer and autumn, the mosses and saxifrages so common on the limestone formations in the Pyrénees.

As to the flavour of the flesh of the ibex, the Author begs to give a most favourable testimony, having had the pleasure, twelve months ago, of dining off a haunch cooked at the Hôtel de France, at Pau, in Gardére's best style, and the feast presided over by its slayer. The flesh was higher in flavour than venison, but not so juicy, and being well piqué'd, it was altogether exquisite in its way.

It is said that the ibex is still found among the eastern Pyrénees, but the information on this subject is not very authentic. We believe the Alps and the Pyrénees to be the only well known habitation of these animals. Of course we do not include the Carpathian and Ural mountains, as being out of the reach of sporting society.

In hunting the izzard and ibex, the sportsman often comes on the traces of the bear; but any sport derivable from this source is very little to be depended on. Bears are great rarities at all times in the valley of the Eaux-Chaudes, and are perfectly safe from all pursuit in summer in the boundless forests. This animal is essentially a wanderer, and never remains two nights in the same place. Generally on the move, he chooses a road easy enough for himself, but rather impassable for man. They may, however, be met with accidentally. If

wounded without being disabled, he attacks the first person he meets with persevering fury. Persons cannot be too strongly warned against imagining that the bear of the Pyrénées resembles the poor miserable dancing bear with a ring through his nose, or those confined in a menagerie, or even in a pit at the zoological gardens. Though unable to take a sudden spring like a cat, when once in motion they are able to take leaps, astonishing to those who suppose them to be awkward and unwieldy.

The bear, however, never commences an attack ; at least, we know of no case in which he has been the aggressor, and we have heard of many in which both parties have retired from the field without coming to blows, the man from being unarmed, and the bear from unwillingness to fight till injured.

From the difficulty of finding the bears in summer and autumn, it is better not to make any attempt in the way of hunting them, unless authentic notice is obtained of their being traced to their dens. Then it comes to a fair stand-up fight, where nerve and presence of mind are required to achieve a conquest. Without these qualities, it may be desirable to leave monsieur bruin quietly *chez lui*.

The coq de bruyère is common in the high pine woods. The manner of shooting them is by going in the spring (May) over night to the ground, camping out, and at daybreak starting through the woods. When the sportsman hears the cock crow, he must

run to the spot and get his shot. They leave off crowing as soon as the sun gets warm ; so the sport is but short, and the fatigue very great, owing to the nature of the ground. The bird is first-rate eating.

The wolf is very rarely hunted from its fastnesses in the mountains. It is only when an unusually severe winter clothes the Pyrénées with deep snows, even in their sheltered nooks, and drives the wolves into the plains, and in the neighbourhood of towns, that people rise to protect their poultry, sheep, and domestic animals from becoming their prey. During the months of March and April of this year (1842), some wolves were discovered to have taken up their abode in the Bois de Pau, only a few miles from the town, and on the side most distant from the mountains, and three field-days were got up by the English and French to extirpate them. Each day they found and killed their game. The plan was to post the shooters and beat the wood, which drove the wolves into the open country, where they speedily fell under the aim of some one of the belligerent parties.

We would now fain bring the reader, after the long and tedious digressions which have taken place since losing sight of Pau and its climate, back to the main objects of this work, viz., to a description of the watering-places of the Pyrénées, the analysis of their respective waters, and their sanative influence on disease.

CHAPTER XI.

SHORT REVIEW OF THE ANCIENT HISTORY OF MINERAL WATERS.
THE MINERAL WATERS OF THE PYRENEES. DIVISION INTO
THREE CLASSES—SALINE, FERRUGINOUS, AND SULPHUROUS.
MINERAL WATERS TREATED OF, AND WATERING-PLACES
DESCRIBED, IN THIS WORK. THE GEOLOGIC FORMATIONS
WHENCE SPRING THE DIFFERENT MINERAL SOURCES. THEIR
THERMAL TEMPERATURE. CONJECTURES AS TO ITS CAUSE.

IN the earliest ages, before science had commenced its successful inroads into the secret recesses of nature, and philosophy had, from a crowded store of facts, learned to deduce general principles, to guide man in his groping search after remedies, for the relief of the maladies incident to his condition, the utility of mineral waters had been felt and acknowledged, and their virtues, believed to have been graciously bestowed and especially watched over by Heaven, were resorted to, as a solace and cure for every description of mortal injury and ailment. Thus success alone, and not any bolstering up by analysis or theory, first laid the foundation of a fame, which in many cases, even the lapse of time, an unerring test, has not succeeded in destroying.

The Greeks, whose knowledge of medicine, as of all liberal arts and sciences, surpassed that of the

nations who preceded them, held the warm springs in high veneration, regarding them as a special gift of the Divinity, and dedicated them to Hercules, the god of strength. These springs were in use among this nation, both as an internal and external remedy, and that they should have been brought to bear as powerful auxiliaries against disease, is not surprising in a country and an epoch which gave birth to two such luminaries in medicine,—Aretæus and Hippocrates. In the works of the latter, we have distinct mention made of hot springs impregnated with metallic and saline substances, the use of which, however, as an internal remedy, was interdicted. Aristotle, four hundred years before the Christian æra, pointed out that certain mineral waters derived their chief properties from certain vapours or gases that were mixed up with them. Strabo describes a miraculous source, to which he attributes the property of dissolving stone in the bladder. Archigenes recommends the internal use of mineral waters in disease of the bladder, in a dose of from one to twelve pints. We read of several Greek physicians, who employed mineral waters as a remedy against elephantiasis, colic, paralysis, and different nervous diseases, and we find that, at this early period, divers sources, sulphurous, aluminous, bituminous, nitrous and ferruginous, were known and remarked upon. Galen indulges in praise of a bituminous and ferruginous spring, serviceable to

those suffering from gravel; but forbids it as a remedy for persons of particular temperaments.

The mineral waters were a remedy familiar to the Romans, who were in the habit of taking those of Italy; the Emperor Augustus himself being indebted to an Italian spring, for the cure of a pulmonary catarrh, complicated with dropsy of the legs, and Horace thus boasted of the baths of S. Cassiano:—

Qui caput et stomachum supponere fontibus audent
Clusinis.

Vitruvius, equally a student of natural history and architecture, describes the nitrous waters as purgative; but Seneca the philosopher is more communicative. He declares some to be good for the eyes, others as having the power to cure inveterate maladies and ulcerations, and as internal remedies, some remove diseases of the lungs and bowels, and arrest hæmorrhage. Pliny, in his *Natural History*, speaks of waters, acidulous, sulphurous, saltish, nitrous, aluminous, ferruginous, and bituminous. He says that the sulphurous waters are very good for the nerves; and that the aluminous is most beneficial in paralysis. Oribasius, who lived under the Emperor Julian, praised very much the natural mineral waters in affections of the stomach and liver. Aetius, born in 405, appears to have had a clearer view of the virtues of mineral waters. He prescribes the sulphurous and aluminous waters in nervous and rheumatismal diseases, and above all in

the cure of leprosy, itch, and other eruptive disorders, and lauds the ferruginous waters in chronic diseases of the liver and stomach.

Wherever the Romans carried their victorious arms, they sought out the mineral waters and took up their abode in the neighbourhood of hot springs, without doubt, because they had had experience of their healing powers in wounds and injuries received in war. In gratitude for the benefits received, they erected temples and votive altars to the divinities, whom they had named as the protectors of those springs. Many are the evidences still existing of the respect in which the Romans, at their earliest conquest of Aquitania, under Julius Cæsar, held the mineral waters of the Pyrénées; and when we come to speak of Bagnères de Bigorre, we shall have an opportunity of pointing out several of these remains still in comparative preservation.

In the tenth century, when the science of medicine found shelter among the Arabs, mineral waters were held in repute. Avicenna recommends them in visceral obstructions and divers internal maladies.

After the fall of the Roman empire, the mineral sources of France remained neglected until the reign of Charlemagne. Convinced of their utility, that monarch caused a vast bath to be constructed at Aix-la-Chapelle, where he and his officers were in the habit of bathing. The other mineral sources began to be frequented, when his death and the

division of his territories plunged France anew into ignorance and barbarism.

It was not till the end of the fifteenth century that physicians paid much attention to mineral waters; and the Italians were the first to revive their ancient celebrity. In 1498 Savonarola of Padua composed a treatise on baths in general, and on the thermal waters of Italy particularly, and investigated the cause of the temperature of those waters, as well as the properties of the sulphur, alum, nitre, chalk, and iron, which entered into their composition.

Henri Quatre, who during his youth had much frequented the Pyrénées, and who had witnessed the abuses which prevailed, attempted, on his mounting the throne of France, to check them, and issued in 1603 certain edicts and letters-patent, naming superintendents and intendants general, who were charged with the minute surveillance of the waters, baths, and mineral fountains of the kingdom. These edicts were confirmed by subsequent monarchs; and at the present day, at each watering-place, there is a medical inspector appointed by the government, to one of the departments of which he is bound to make annual reports, as to the state of the watering-place under his charge, and as to the therapeutic action of the waters on disease. During the seventeenth century, the study of mineral waters became fashionable in France. At a later period, Fagan, the physician of Louis XIV., examined with care the

waters of the Eaux-Bonnes and Barrèges, to discover if they would be a proper remedy in the cure of a *fistula in ano*, from which Louis suffered. Already the sources of Barrèges, Cauterets, and Bagnères, attracted a great number of invalids. In some provinces certain fountains were placed under the protection of saints, and at a fixed period of the year, the people made pilgrimages to implore the aid of heaven in their favour. Nearer to our own times, physicians in different countries spake with enthusiasm of the mineral waters of their districts. Conrad Gesner eulogised the thermal waters of Switzerland; Hoffman those of Germany; Allen and Lyster celebrated the waters of Bath and Buxton, while Boyle sketched a treatise on mineral waters*.

Since that period, the most illustrious names in the French galaxy of science have been mixed up with the numerous researches, chemical and medical, which have taken place from time to time, to elucidate the composition and virtues of the French mineral waters.

The individual history of each Pyrenean watering-place not entering into our plan, the composition and curative virtues of their waters shall be given hereafter. The watering-places which we have selected for description are Bagnères de Bigorre, Capbern, Barrèges, St. Sauveur, Cauterets, Eaux-

* *Manuel des Eaux Minérales*, par le Docteur PATISSION.

Bonnes and Eaux-Chaudes; the first possessing a variety of springs chiefly of a saline, and one of a ferruginous nature; the second a source entirely saline; and the remaining five, many sources of different strengths, highly sulphurous in their properties.

The saline sources of the Pyrénées most usually spring from the schistous limestone, or, as in the majority of instances at Bagnères, from the alluvial deposit. The only ferruginous spring to be noticed in this work, viz., one in the neighbourhood of Bagnères, proceeds from a soil containing very considerable quantities of amphibole and feldspath, while the sulphurous thermal waters well out from the primitive or granitic formations. To this latter geologic circumstance, we scarcely ever find exceptions. We see these waters flowing in the granite, gneiss, micaeuous schistus or eurite, while if we pass the limits of these primordial strata, we discover no traces of them.

The temperature of the thermal springs is, without doubt, one of the most surprising, as well as obscure phenomena of our globe, and many hypotheses have been proposed as a solution of this difficulty. The temperature of these springs, always under that of boiling water, has yet remained nearly the same for ages. Some sources, occasionally, show an appearance of ebullition; but this occurs principally during storms, and is produced by the disengagement of

nitrogen and carbonic acid gas, from an altered state of the atmospheric pressure.

The following are some of the hypotheses, which have been, from time to time, promulgated ; but we are bound to confess that neither of these meet all the difficulties of the mystery.

1. The calorific cause has been supposed to arise from certain inextinguishable fires, which diffuse heat to great distances in the bowels of the earth ; the volcanic fuel of these fires being the carbon, produced by the insensible combustion and slow decomposition of ages, of the forests which formerly covered the surface of the mountains of the first order,—forests which had been embedded under the immense ruins of a general *bouleversement* of the world. From the decomposition of these forests and other organic bodies, buried under the ruins, were supposed to arise the carbon, bitumen, vegetable salts, sulphur, gases of all kinds, in a word, the volatile and fixed principles which the experiments of chemists discover in these mineral waters. The objection to this theory is, that there are no marks of any internal volcanic action, which must undoubtedly have taken place on this supposition.
2. According to some, the cause of heat arises from the mineral acids quitting their primitive bases to assume new forms ; the results of which decomposition and synthesis, being the salts found on evaporation, and the caloric engendered by the transfer ;

but if the heat were the result of decomposition and new combinations of mineral substances in the earth, we should not always have the same temperature and the same proportions of principles present, which, however, we find unvarying in the same sources at all times. 3. Struck with the influence of the electric fluid, whose powers are found to be so universally diffused, theorists have called in its aid, as affording a solution of thermal heat. This cause, however, appears too mobile, and subject to too many and eccentric variations, to explain an effect so constant, as the temperature of mineral waters. 4. Another opinion, which was that of Sir Humphry Davy, attributed the thermal heat to the reactions caused by the rapid decomposition which metals still inoxidated produce on water at the moment of contact, by which process much caloric is disengaged, and the principles, in dissolution in mineral waters, are produced. 5. Several metallic substances mineralized with sulphur, such as iron pyrites, in a state of pulverization, give out caloric on the contact of water; it has therefore been presumed that the heat of mineral springs may be traced to this cause. However, it may be answered, that the sources of highest temperature are those in which we do not find iron or any metallic substance. 6. Central fire has been, in all ages, believed in, and has been claimed with considerable confidence in our own time, and with great plausibility, as the source of

thermal heat. A work by M. Cordier*, published in 1827, had forcibly drawn public attention to this subject. From experiments made by this learned Academician, it appears, that in penetrating from the circumference towards the centre of the globe, an increasing temperature is experienced of nearly two degrees for every forty yards of depth. If this be approximatively correct, (and the results of the experiments at the Observatory of Paris, as those of the Artesian well lately sunk near Paris, support M. Cordier's calculation,) he estimates that a heat equal to that of boiling water, would be found at a depth of about half a league from the surface of the soil, a distance considerably less than that of the height of many mountains. If we suppose this increasing temperature to be regular, there would be an elevation of 500,000 degrees at the centre of the globe, an amount of heat strong enough to melt and dissolve the most refractory substances in nature or in imagination.

M. Arago†, from a multitude of facts and observations, has established this principle, that there exist at various depths, in the body of the globe, veins and sheets of water more or less considerable; these waters, by their gravitation, finding their way towards the centre through various fissures, from the

* *Essai sur la Température de l'Intérieur de la Terre.*

† *Annuaire du Bureau des Longitudes*, 1835.

mutual retraction of strata. Being volatilized by the absorption of caloric from the central source, they ascend in vapour and carry with them in their upward course the component principles of mineral springs.

However plausible, and whatever amount of truth there may be in this, there is still something wanting here, as in all the other hypotheses. It is the stubborn and unvarying point of temperature of the thermal waters at their source, and the constant relative proportion of their ingredients, for which none of the theories fully account. Human science has done much to elucidate nature's operations; but she has her mysteries, and these mysteries are for the present veiled from human vision.

If, however, we cannot fathom the secret, it is at least an interesting occupation to penetrate as far as may be permitted, into the temple, which contains that secret. In the next chapter, therefore, we shall bring before our readers matters of more tangible import.

CHAPTER XII.

GENERAL CONSIDERATIONS CONNECTED WITH THE SULPHUROUS
WATERS OF THE PYRENEES. BARREGINE, OR GLAIRINE, SUB-
STANCE FOUND IN THESE WATERS, AND PECULIAR TO THEM.
GENERAL ANALYSIS. CHEMICAL ANALYSIS FAILING TO SOLVE
THEIR THERAPEUTIC ACTION ON THE HUMAN FRAME. THEIR
THERAPEUTIC ACTION IN DISEASE. GENERAL TESTS AS TO
THE SYMPTOMS INVARIABLY BENEFITED, ALLEVIATED, AND
AGGRAVATED BY THE USE OF THE SULPHUROUS MINERAL
WATERS.

In this chapter we shall direct our attention exclusively to the subjects of the sulphurous waters of the Pyrénées, because they are those on which the reputation of the mineral sources of this country depend, and for the use of which a large majority of persons resort to this part of France. The general and special qualities of the saline and ferruginous springs, and their therapeutic influence on the human frame in disease, will be fully detailed in the chapters on Bagnères de Bigorre and Capbern, where those sources are chiefly to be found. This plan of treating the subject leaves the ground less embarrassed, in discussing the important question of the therapeutic action of the sulphurous waters in different pathologic conditions of the body, and in deducing some fixed rules, as to when they may with a great

degree of certainty be depended on, when they alleviate, and when aggravate disease. This, after all, is the chief point to be considered, and one, if satisfactorily discussed, which ought to constitute the chief value of that part of this work, which treats of the mineral waters of the Pyrénées; since so little discriminative attention had been paid to this subject, in the proper quarter, as to have drawn down at different periods, on the inspectors of the mineral sources, rebukes from the commission of the Royal Academy of Medicine at Paris, appointed by the Government to receive and report upon the annual returns of these functionaries; for persons with every kind of disease, in every variety of temperament, might, as in a lottery, stake his case upon the result of a doubtful and often direful hazard.

The sulphurous mineral waters derive their name from the sulphuretted hydrogen gas and the hydro-sulphate of soda which they contain. Their odour is more or less fetid, resembling the smell of rotten eggs, and they contain, with some other saline principles, in varying quantities, an organic substance, whether of an animal or vegetable character has not yet been clearly decided, called barrègine, or glairine. Like animal matter, it gives out an ammoniacal odour on burning; but late microscopic observations claim it as a vegetable production. It has a mucous appearance, is smooth to the touch, and is met with in different forms; sometimes it is fibrous, flocculent,

compact, or membranous, and its colour also varies, being white, brown, green, or red. It is found in abundance in many of the Pyrenean sulphurous waters of strongest medicinal powers, and their unctuous properties are supposed to be owing to its presence. It is believed also that the glairine communicates some unique powers to the waters, in the cure of muscular rigidity, tendinous contractions and chronic rheumatic affections of joints. It may be remarked that the sulphurous springs of Germany do not contain this substance.

The sulphurous waters of the Pyrénées, though rich in elastic principles, contain only a very small quantity of fixed matter; for those, which possess them even in greatest quantity, leave after evaporation a residuum, only the three thousand four hundredth part of the water evaporated. Indeed, analysis does not at all suffice to give an explanation of the powerful effects of these waters on the human frame, there being many to be met with, Capbern among the number, showing few tangible results to the chemist, yet exercising energetic influence on disease. So much has this been felt to be the case, that the illustrious Chaptal declared, that in experimenting in the laboratory on mineral waters, with a view to discover their properties, it is the dead body of these waters alone that we operate on, the subtle principle, which gave to the chemical ingredients a vitality, having fled. It was Vauquelin's

opinion also, that the remarkable effects which we see produced by waters, in which analysis finds little or nothing of activity in the ingredients, prove that there exist in nature many principles so subtle, as to be entirely withdrawn from our limited means of investigation, and whose existence can only be conjectured, as in the matter under consideration, from the effects produced being totally different from those which waters artificially formed of the known and tangible ingredients of true mineral springs would display.

To aid the theorist in his endeavours to account for the effects produced on the human system, so different from those which the known ingredients, without some other aid, would evince, recourse has been had to a principle which has been designated, thermo-electric,—a principle wedded most intimately to, if not constituting, the hypothetical matter of thermal caloric. Those who have had experience of the medicinal operation of hot springs, must be convinced that the waters enjoy at their source a species of fugitive vitality, which agitation, transport, and cooling rob them of. It is clear, therefore, that these mineral waters cannot be successfully imitated; and that it is necessary, in order to insure their beneficial effects, that they should be taken at the source.

Medical properties of the waters. The sulphurous waters are very exciting; they stimulate the gastro-intestinal mucous membrane, and in propor-

tion as they are more or less well digested, they cause an increase of appetite, or the reverse, constipation or diarrhoea; they accelerate the pulse, produce a sense of internal heat, watchfulness, and agitation: occasionally they create determination to the head, causing a transient intoxication; the crisis of their favourable action being abundant perspiration, eruptions, and considerable increase of the urinary secretion*.

The waters are taken, internally and externally, in baths and douches. The waters being so stimulant, it is necessary, even in cases where the symptoms of disease indicate their use, that the dose should at first be small, and cautiously administered. It is customary to commence a course with a dose of half a tumbler, mixed with one-third of the quantity of tepid milk. Under medical surveillance, this may be gradually increased, until the maximum is reached, say three or four tumblers a day, should no opposing symptoms intervene, suggestive of a diminished dose or temporary intermission. It is usual for the invalid not to commence the baths for some time, until his system shall have become accustomed to the stimulus of the waters. The baths, in reference to their strength and temperature, should not be taken, except under medical

* *Manuel des Eaux Minérales*, par PATISSIER; of which excellent text-work the Author has freely availed himself.

surveillance; as many shades of symptoms depending on the disease, or called into action by the treatment, require appropriate changes in the qualities of the baths. The baths and douche are often associated with the internal use of the waters, and thus combined, they often produce very surprising effects. The douche is a column of mineral water, which is directed with considerable *vis a tergo* upon some one part of the body. There are three kinds of douches; when the column of water is directed vertically on any part, it is called descending; if the column of water is directed horizontally, it has the name lateral; and from below upwards, ascending.

As to the mode of action of the thermal waters on our internal organs, there is still considerable obscurity. We only know that they stimulate visceral circulation, with a force proportioned to their temperature and composition; that they penetrate the circulating fluid itself, to which they give a centrifugal impetus, and influence, at the same time, the different secretions. In baths, the mode of action of the thermal waters is more easy of appreciation; in this form they purify the skin, re-establish perspiration, and operate a revulsion from the centre to the circumference. The cutaneous apparatus becomes red, injected, tumified, acquires increased temperature, and a refreshing moisture, and is the seat of moderate sanguineous

congestion over its whole surface, often beneficial and always exempt from danger. It is easy to imagine the influence this stimulation of the skin, and new impulse given to the circulation, must have in restoring to the surface different cutaneous affections which had retreated into the interior; in re-establishing habitual evacuations, devious, diminished or suppressed; in developing venereal maladies, masqued or imperfectly cured, and, indeed, in all internal diseased actions depending on metastasis of eruptive disorders, such as itch; of rheumatism, and of venereal virus; on diminution or suppression of perspiration, of the menses, or of haemorrhoids. The thermal waters, in the form of baths, are not less salutary in rheumatismal affections, lumbago, sciatica, paralysis, scrofula, and against the host of cutaneous eruptions, which depend on irregularities of the perspiring organ, or an abnormal excretion from the skin. Their unctuousness succeeds perfectly in rendering tendinous and ligamentous parts more supple, and in giving greater freedom of motion to limbs, which had suffered from contusions, sprains, and fractures, and accelerates the healing of gunshot wounds, and atonic and fistulous ulcers. These waters also taken internally, and applied externally, promote in a peculiar manner the exfoliation of diseased bones, and the working to the surface of foreign bodies or deep-seated abscesses.

The mineral baths produce often an eruption,

(*psydracia thermalis*) which resembles very much scarlatina, miliary or other cutaneous diseases. This eruption, determined by a salutary effort of nature, produces a most useful derivative effect. It is often the precursor of the re-establishment of health, of which the works of the medical inspectors furnish many examples. The cure of chronic pulmonary catarrhs, of gastralgia and enteritis, is often preceded by pimples, blotches, pustules, articular swellings, and tetterers, of the germs of which the invalids were little conscious that they were the bearers. These eruptions, far from being dangerous, ought to be regarded as a beneficial result of the waters. They speedily disappear even during the use of the baths; but should there remain any isolated pimples or irritation of the skin, after the termination of the treatment, we recommend the invalids to leave them undisturbed as a means of assuring their cure and preventing a relapse.

The douche increases the vital action of the part on which it strikes; it inflames the skin; covers it with small pustules, which would become blisters were the action of long duration. The douche ought not to be continued above a quarter of an hour, if it be received on one point. Continued for a lengthened period, in place of producing a moderate and healthy excitation, it would certainly produce serious inflammation. We have seen the douches violently applied to the head, vertebral column and

abdomen, produce inflammation of the membranes of the brain and spinal marrow, colics and vomiting. Administered with precaution, the douche is one of the most energetic means which art possesses against a multitude of local ailments. It is a sudorific more powerful than the baths. The percussion and shock which it occasions diffuse themselves into the penetralia of the tissues, change their mode of vitality, and arouse an activity which, transmitted to the internal organs, creates in them favourable reactions. On whatever point one wishes to stimulate vital action, or cause a chronic inflammation to pass into the condition of acute, we may always depend on producing this effect by bringing the douche to strike on this point. Recourse is, therefore, had to the douche with success, in cases of atony and partial relaxation, in incomplete ankylosis, contractions of the limbs, cramp, stiffness of the joints, chronic rheumatisms, sciatica, lumbago, local loss of power and paralysis, indolent tumours, white swellings, without inflammatory complication, circumscribed and obstinate ringworm, &c. In paralysis of the limbs, the douche is used to the spine. Directed to the loins, the lower part of the abdomen, thighs, and perineum, the douche is a most powerful means of re-establishing the menstrual and hæmorrhoidal flux. Applied with discretion to the abdomen it is very useful in chronic engorgements of the viscera contained in that cavity.

Having thus given, in a general way, the effects of the waters taken internally, and by bath and douche, the inquiry naturally follows, are these effects constant in all states of the human system, and is it desirable and safe, under all circumstances, to produce them? In other words, what are the indications arising from diseased action, which invariably and safely appeal to the curative influence of these mineral agents; and what are they where the result would not only be doubtful, but highly prejudicial?

This is an important inquiry, and one demanding no little discrimination. It may be supposed that, during the course of some years' experience, of the effects of these sulphurous waters, chiefly at Cauterets, whose numerous springs are almost an epitome of the other sources scattered over the extent of the mountains, and from opportunities he has had of witnessing their powers in other places, the Author should have accumulated many facts and have endeavoured to deduce, for his own guidance, some general principles. It was his original intention to have given, in this place, those views, however imperfect; but he considers that he will be conferring a greater benefit on the professional reader, if he here substitute, instead, the substance of the last Report of the Commission of the Royal Academy of Medicine at Paris, a document well worthy of acceptation.

Since the year 1824, the Royal Academy of Medicine has been charged by the Government to

examine the annual documents sent by the physicians, inspectors of the mineral waters of France, with the view of establishing statistical facts, and of founding a philosophic system of therapeutics, as to their administration and action on disease. This commission, consisting of the most able physicians of France, held its first meeting in May, 1824, for its organization; and since that year it has been in the habit of meeting once a month, or whenever its duties have required it, and has, from time to time, issued reports founded on the *data* supplied by the medical inspectors.

To one of these reports, viz., the last, for the years 1838 and 1839, and read before the Royal Academy the 14th of August, 1841, it is our design more particularly to direct the attention of the reader. These reports having a limited and private circulation, and not likely to come under the notice of the general reader, we conceive that a benefit will be done to the invalid public by giving the facts and opinions contained in them a wider circulation. When we come to describe the individual watering-places, we shall see the application of the principles here enumerated carried out in detail. We consider that there cannot be more unimpeachable testimony than that furnished by the reports of this learned and disinterested commission, as regards the qualities and powers of these sulphurous waters. Their characters, and the absence of every personal considera-

tion which might bias their judgments, afford the strongest guarantee of the value of the evidence; for, as the report* at its outset says, "Strangers to every local thermal interest, your Commission has not sought to exalt in your opinion such and such a fountain: they have viewed, disinterestedly, the practical science of this mode of cure, and the only aim of their researches has been to reduce, to their just value, the vaunted virtues of the waters, and to furnish to practitioners some positive data to guide them in the choice of a source, according to the character of the maladies and the temperament of the invalid; happy if, by their feeble aid, they co-operate in the progress of medicinal hydrology, which unfortunately is too little known to the majority of professional men."

The report commences with a proposition for discussion, viz., "May we prescribe, without distinction, the different mineral sources for all chronic maladies?" or in other words, "Is it indifferent whether we direct an invalid to Barrèges, Neris, Vichy, Mont d'Or, &c., whatever may be the nature and cause of the malady?"

Those who have made the science of mineral hydrology a serious study, will no doubt be surprised that such a question could come to be agitated

* *Rapport sur les Eaux Minérales Naturelles fait au nom de la Commission des Eaux Minérales, pour les années 1838, 1839; et lu à l'Académie Royale de Médecine, le 14 Août, 1841.*

and furnish matter for controversy. But at the present day there is nothing, however evident, that is not disputed, nothing, however salutary and true, that casuistry will not contest. It was, therefore, considered to be a duty to refute a doctrine which, being supported by the authority of certain physicians, might lead to fatal consequences in practice; besides, to combat and overthrow an error is to strengthen truth.

1st. To set forth that all mineral waters are equally suited to all chronic maladies, is to declare one of two things;—either that the waters are an universal remedy, and diseases present the same symptoms, the same seat, and the same causes, which is evidently a paradox: or that the medication is proper to all, that is to say, without intrinsic power; and its efficacy owing only to the journey and to the *distractions* which it causes. But we demand of those physicians who entertain this latter opinion, if the charms of a fine site, however marvellous it may be in point of beauty, suffice to cure chronic rheumatism, palsies, false ankylosis and fistulous sores, or the consequences of gunshot wounds? What are the amusements, what the pleasures of the many sick, who pass the season of the waters in their chamber or in bed, alone, far from their relatives; as well as of the crowds of indigent, who, nevertheless, are evidences of cure the most remarkable and numerous? Do we not often see

even persons, affected with nervous disorders, which had resisted the regimen of long voyages and amusements of all sorts, promptly and permanently restored, under the influence of mineral waters? Is it necessary to recal to mind that amusements and change of scene cannot be taken into account, in the effects, not disputed, which the mineral waters taken, even at a distance from the source, produce? In short, do not the horses, suffering under chronic maladies of the chest, which drink each year with success the waters of Cauterets, Eaux-Bonnes, &c., furnish irrefragable proof of the powerful action of these waters upon them?

2. Forced to acknowledge that change of scene and atmosphere, and climate, do not afford a reason of the success obtained by the use of their sanatory sources, the detractors of this curative agent attribute their benefits solely to the water, properly so called, which it introduces into the system. Pure water, it is true, is a very powerful solvent; it favourably modifies the circulating fluids, facilitates secretion, and is the vehicle to which the greater number of ptisans exclusively owe their virtues. It, nevertheless, cannot be denied, that the natural temperature and chemical composition of the greater number of minero-thermal sources, impress them with special characters and a curative power much more energetic. Is it not well known that, as an experiment, thermal water taken at the same temperature, and

in the same quantity, is more light, penetrating, and infinitely more easy of digestion, than common water? No one can be ignorant of the fact that many sources are so active, that one cannot drink of them with impunity, in cases where they are contraindicated, and we often see healthy persons who, from curiosity, take these waters, attacked with gastro-intestinal inflammation.

3. Nevertheless, enlightened by the numerous and undeniable facts, related by exact and trustworthy observers, the majority of physicians concede to these waters a medicinal power, independent of all accessory circumstances; they agree that used in draught, in bath, and douche, they are always stimulant, acting internally and externally, with more or less force; that they are, in a word, *exciting* in different degrees: but they conclude that, with the precaution of graduating the excitement, according to pathologic forms, all the sources may be placed on the same level, and indifferently prescribed with the same probabilities of success in all chronic maladies. We might cite many appropriate facts to warn us against this indifference, but we prefer leaving Tissot, whose authority will have more weight than ours, to speak on this subject. "I saw, in 1777," says this celebrated physician, "a lady sent from the north of France to Barrèges, with whom those waters succeeded so badly, that fourteen months elapsed before she could return home."

After citing other cases, he goes on to say, "We here see how important it is to know exactly the virtues of mineral waters, and how dangerous it is to consider them as an indifferent remedy, to which one may loosely counsel resort, and of which we often leave the choice to the invalid*." But the opinion of the class of physicians now under consideration, is unquestionably too absolute. In fact, although organic excitation may be one of the great powers of these waters, still we cannot admit this to be their only mode of action. Is it, for example, to excitation only that we can attribute the efficacy of the waters of Eaux-Bonnes and Cauterets in chronic affections of the respiratory organs? If it were so, all these waters should be suited to the cure of these maladies, because they are stimulant; such a claim, however, is negatived by the very common experience, that these waters do not act, in these cases, as instruments of excitation; but, according to the observations of Bordeu and Bertrand, they succeed in the instances where stimulating remedies had previously aggravated the evil. We are, therefore, forced to acknowledge, that there are several sources which possess virtues altogether peculiar and special, unknown in their nature, and calculable and appreciable only in their effects. In fact, close observers have arrived at the conclusion, that the waters,

* *Traité des Nerfs et de leurs Maladies*, p. 251.

according to the diversity of their composition, produce specially an impression on such or such an organic system ; thus the sulphurous waters act particularly on the lymphatic and tegumentary systems—the saline, more or less laxative, provoke a movement of the digestive canal, while the ferruginous and alkaline waters, more penetrating, modify the humours in a manner more or less appreciable.

4. Since then, sulphur, carbonic acid, iron, and neutral and alkaline salts, enter into the composition of mineral sources, we cannot see why the waters in which these principles are found, should not possess, at least, the special virtues of these principles. Is it, that these substances lose their medicinal properties when they pass through the hands of nature in place of those of the druggist ? So far, however, are these ingredients from being deprived of their activity by their union with the waters, that there is every reason to believe that the state of division to which they are reduced, favours much their assimilation and distribution in the different parts of the body. It is certain, for example, that the natural waters of Vichy, which contain a very small quantity of bi-carbonate of soda, are infinitely more easy of digestion by the invalid, and much more salutary in their effects than in the draughts prepared with the same salt : the ferruginous sources, also, which contain minute quantities of iron, cure diseases which have resisted every description of steel medicine ; so

true it is that the preparations of nature possess an energy which the mixtures of art can never expect to rival.

5. Where even a dissimilarity in the chemical and physical properties of the most celebrated sources does not readily indicate the nature of the difference in their medicinal virtues, has not bedside observation, agreeing with the tradition of ages, arrived at a solution of the difficulty?

It is known, from experience, that some of these waters cure, or alleviate, rheumatism, and others paralysis; that one class is recommended for pulmonary consumption, and another for visceral obstruction; that here we send persons afflicted with gravel, there, those suffering from cutaneous diseases. Although these exclusive properties may be subordinate to several circumstances, difficult of appreciation, still they are not the less real nor less sacred, by the test of time. We are bound, therefore, to admit, that in many sources there are medicinal aptitudes which decide their mode of utility in certain special cases.

Nevertheless, it must be confessed, that the authors of monographic notices of the mineral waters have diffused much uncertainty in this branch of therapeutics, in almost invariably confining themselves to an enumeration of the maladies, against which such and such a source may be employed, without specifying the indications, that is to say,

without designating the kind, the degree of the disease, nor the circumstances in which these remedies, of a nature very different, and sometimes even opposed, may be particularly suitable; also, we find frequently that waters, which have been useful against some morbid affection, have not only not succeeded, but have even been prejudicial, in cases to all appearance similar. It is evident, that to the want of these distinctions, is to be imputed the imperfection of our knowledge as to the curative action of the sanatory sources. All the eulogiums which are lavished on the waters are vain and dangerous, so long as the cases in which they ought to be applied are not specified with precision. To attain this object, the physician ought to bring together the facts, favourable or not, which he has collected; compare them; endeavour to reconcile them; and to draw from them such deductions, as may aid him in determining the pathological states, for which the source which he directs is suitable; and at the same time, in deciding on the exclusions resulting from age, sex, temperament, complications, and from the nature, causes, and condition, more or less advanced, of the disease. Thermal medication is, as may be therefore seen, one of those which demands of the physician much tact and attention in its appropriation to different pathologic states of the human system: if he grounds his choice of a source only on the external features of a disease, he is

exposing himself frequently to failure and to perilous miscalculations. To make this more clear, we cite some examples.

It is notorious, that most mineral waters have been recommended, as an excellent curative means, in chronic affections of a nervous character : hysteria, hypochondria, chorea, &c., which too often resist the usual resources of pharmacy. But if we take not into consideration the producing causes of these maladies, we run the risk of exacerbating them. When the nervous diseases are functional, depending on certain moral impressions, on an exaggerated sensibility, on rigidity, or a too highly toned state of the different tissues, they are powerfully ameliorated by the mild unctuous and sedative baths of St. Sauveur, the Salut at Bagnères, &c. But when the diseased action originates in, and is maintained by, feebleness of constitution, abuse of watery beverages, and want of exercise, as we frequently meet with in females of a certain class, nursed in luxury in large towns, it is then necessary to supply organic tone, and to achieve this, to call in the aid of the stronger sulphurous sources. If again, the nervous symptoms depend on a metastatic* cause, if they are the produce of suppression or irregularity of the menstrual or hæmorrhoidal flux, of a check to perspiration, or of rheumatismal, gouty, or herpetic retrocession, one

* Metastatic signifies changeable with respect to situation.

ought, in order to produce an energetic revulsion, to have recourse to baths and douches of thermal waters, strongly mineralized. In short, if the nervous maladies are accompanied, as in hypochondria, with visceral embarrassment in the abdomen, then the waters of Vichy, Balurac and Plombières, are indicated.

Rheumatismal maladies also, for which all the thermal waters, endowed with a high temperature, have been extolled, display the necessity for choice amongst all the sources; thus, those of long duration, affecting robust persons, little *impressionable*, are quickly cured by the active waters of Barréges, and others of the same class; but, if the rheumatism be recent, accompanied with inflammatory symptoms, and if the invalid is of a highly nervous habit, the mild waters of Neris, Salut at Bagnères de Bigorre, &c., claim the preference.

The practical statements, now submitted, prove that the medicinal powers of the different mineral sources are far from being the same, and that their success is subordinate to the justness of the relative application of these waters to disease; in a word, the physician ought to exercise an intelligent and watchful discernment, in recommending this therapeutic agent. This truth will still more appear by the following rapid *coup-d'œil*, as to the therapeutic effects, chiefly of the sulphurous mineral waters, to which, more particularly at present, we would direct the attention of the reader.

By experiments with these waters on a person in sound health, they produce results altogether different, according to the temperament and the individual constitution. Thus, a person free from any bodily infirmity, but of a relaxed fibre, with a slow circulation, and a nervous system, little excitable, will experience a strong feeling of *bien-être*, and will feel his strength increased under the influence of the sulphurous bath, even at a temperature of 97° of Fahrenheit;—while, on the contrary, an individual of a nervo-sanguineous temperament, will, in a few days after the employment of these baths, arrive at having loss of appetite, disturbed sleep, scanty urine, constipation; indeed all those symptoms which indicate an excited condition of organic action. The physician inspector of Barréges, Monsieur Pagés, testifies to having seen *persons in health*, after having taken in that establishment three or four *tepid* baths, seized with inflammatory fever, to the extent, as to render a rigorous mode of antiphlogistic treatment necessary; while *in a state of disease*, the tolerance of these waters is very remarkable. It is worthy of observation, that this power of bearing up against these unique properties, diminishes in proportion as the invalid approaches a state of sound health. A naval captain, whom long continued rheumatical pains had crippled and rendered useless, took, during three seasons, the baths of Barréges, and was completely cured. During his fourth visit, which he

made out of gratitude, he could not support the same baths, which had been so propitious on preceding years; so true it is, that sound organs do not feel after the same manner, as when they are diseased.

The *strong* sulphurous waters ought to be administered with the greatest caution, since they cause indolent affections to pass with extreme promptitude to the acute state: they are favourable, when organic action is feeble and languid, in individuals of a loose fibre, and of deficient irritability. They are not salutary, except in chronic affections, deprived of an inflammatory character; and their efficacy is more felt where the diseases are of long standing. Also, in articular rheumatism, if the baths be taken at a period too near to an acute stage, we risk a return of the fit, or a retarding of the cure; while, at a more distant period, there is much more chance of success. It is the same, also, with dartrous affections of the skin; it is not the most recent, which most readily yields to this mode of treatment. We ought *unequivocally to proscribe* these waters in all *organic lesions of the heart and brain*, and interdict their use to *infants*, and to all individuals, *sanguine and irritable*, and in all maladies where we can detect an *active inflammatory element*. Physicians will readily comprehend the motives of these contra-indications.

And, again, with regard to diseases of the skin, for the cure of which these waters have been considered

almost specific; nevertheless, they do not succeed, except, when there is great inertness in the vital properties of the skin, and when the patients are more of a lymphatic than of a sanguine temperament. It is a fact, almost invariable, under the action of the sulphurous baths, to see an exacerbation of the symptoms supervene, reviving the morbid action, which is gradually effaced, and gives way to a cure more or less complete. These exacerbations are considered of so much consequence, on the results of thermal treatment, that, according to the experience of Monsieur Gerdy, at Uriage, and Monsieur Barrie, at Bagnères de Luchon, when they have not been produced, a permanent cure could not be calculated on, because the state of the skin had not been sufficiently modified. The new inflammation in raising the morbid state to the pitch of acute phlegmasia, contributes to resolve the engorgement and induration of the skin. To obtain a cure of cutaneous maladies, the length of the treatment ought to be proportioned to their severity and duration; for we ought not to forget, that they are obstinate only, and liable to relapse, simply, because very frequently they proceed from a constitutional cause, dependant on some special alteration of the circulating fluids. It is often, therefore, to an insufficient treatment, that we ought to attribute these relapses, so common in these affections, and not to want of power in the remedy. Monsieur Capuron, physician

inspector at Castera Verdusan, when speaking on this subject, says, "All these affections have been ameliorated, some cured; but in general, the patients leave off too soon the use of these waters, to be cured without relapse."

It is particularly against scrofulous affections of joints, that the sulphurous waters appear to act with great efficacy. M. Pagés has seen, several times, strumous engorgements of joints, even when ulcerated, sensibly ameliorated and even cured by the waters of Barréges, as often as the patients have used them with perseverance, that is to say, during several seasons. "I have in my possession," writes Dr. Pagés, "a number of observations regarding white swellings, which were considered as cases for amputation, by several surgeons, and for which amputation had been actually counselled. These under the influence of the Barréges waters have terminated favorably. I have never, in the hospitals of Paris, seen any mode of treatment produce effects so constantly advantageous. I do not pretend to affirm that our waters succeed in every case; indeed when the organic alterations have arrived near their *dernier terme*, with the constitution of the patient completely deteriorated and undermined by hectic fever, then the waters of Barréges, far from being useful, only hasten an inevitable death."

All the world knows that the waters of Barréges have acquired a just renown for the treatment of

inveterate ulcers, old gun-shot wounds, and retractions of muscles and tendons. Muscular and fibrous rheumatisms, so often attended with the loss of the faculty of locomotion, are one of the maladies, over which the sulphurous baths very frequently triumph. They are on the contrary pernicious in gout, by renewing and aggravating the paroxysms. M. Barrie and M. Pagés cite many instances of such untoward result. Bordeu, the father of the fame of the Pyrenean sulphurous springs, had already remarked, that the gout had frequently shown itself, under the influence of the sulphurous baths taken for a different kind of disease.

The sulphurous waters check chronic uterine catarrh, when it is not complicated with organic injury, but depends on some accidental weakness, or on some morbid principle driven back on these organs, or on some abnormal action of the cutaneous function. They might be of great utility, says M. Carlotti, in all the injuries of the uterus derivable from a weakness of this part, in amenorrhœa from inaction, chronic inflammation, and in ulcers, not the result of cancerous degeneracy or syphilitic infection.

Paryses, which succeed to rheumatism, to cutaneous inflammation or to habitual evacuations suppressed, are relieved or cured by the use of the sulphurous sources; which are, on the contrary, completely contra-indicated in hemiplegia the con-

sequence of apoplexy : because the excitement provoked by these waters might be most dangerous in renewing the congestion of the brain.

It is generally admitted that the hydrosulphurous waters, particularly those of Eaux-Bonnes, of la Raillière, at Cauterets, and of la Bassère, at Bagnères de Bigorre, have been a useful remedy in all chronic maladies of the respiratory organs, but it is necessary to prescribe their use with much circumspection. These waters may be opportune, when the pulmonary affection is the result of metastatic action, and where there does not exist fever, nor where the patient is of a lymphatic temperament complicated with scrofulous deposits. In such cases, M. Buron, the inspector at Cauterets, has seen consumptive patients, whose state was considered desperate, return the following year to the source with their symptoms remarkably alleviated ; often also among those, supposed to have been cured, the march of the disease has been found to have been only temporarily suspended. But when the lungs are a prey to a dis-organizing process, infested with tubercles in a state of suppuration, the sulphurous sources, particularly the very hot, furnish fresh fuel to the irritation, and accelerate the fatal catastrophe. They are also equally fatal to those who labour under hypertrophy of the heart, or large vessels. May these observations then impress on medical men, distant from these sources, that the sulphurous

waters, as applicable to such a state of pulmonary disease, abridge the days of the patient, and that it would be much better to permit him to draw his last breath in the bosom of his family, and soothed by the sympathies of home associations.

These waters repair functional derangements; but cannot re-cast disorganised viscera; it is therefore with considerable confidence, that persons affected with obstinate pulmonary catarrh, where the fever has little intensity, and where there is a predominant atony of the mucous membranes of the trachea, bronchi, and gastro-intestinal mucous membrane, often the forerunner of severe organic lesion, may resort to the sulphurous sources, and to none with better success than to the waters of Cauterets.

Monsieur Buron, from whom the Author has received much valuable information, states, that the proportions of persons cured and ameliorated at Cauterets, during one year, 1839, are, first, of muscular and fibrous rheumatism out of 252 cases, there were 105 cured, 118 alleviated, 11 treated without success, and 18 cured or ameliorated after leaving the waters: second, of chronic bronchitis, out of 265 cases, 118 were cured, 54 alleviated, 78 treated without success, and 15 whose cases were afterwards ameliorated. In asthma, both dry and humid, the number of cases was 108; the numbers cured, none; alleviated, 78; treated without success, 22; and 8 afterwards improved. In consumption, first, second,

and third degree, there were 70 cases ; of which none were cured, 17 derived amelioration, 44 were treated without success, and 9 were afterwards relieved.

Of affections of the skin, at Barréges and Bagnères de Luchon, 1838 and 1839, there were 193 cases ; of these 61 were cured, 67 were ameliorated, 33 were treated without success, and 32 were afterwards cured or ameliorated : and, of 30 individuals grievously affected with muscular and tendinous retractions, inveterate ulcers, or the sequel of gun-shot wounds, 15 were cured at Barréges.

We give these imperfect statistic details with the view of simply affording an approximative view of the benefits derivable, in some instances, from these waters ; and they will not be considered unsatisfactory, when it is recollectcd that cases are sent from all parts without any reference being had to the state of the malady, or the temperament of the patient, in reference to the qualities of the waters.

The effect of the climate of Pau, as has been fully dwelt upon elsewhere, being to reduce the tone of the natural temperament, and to modify arterial action, we have seen several cases of disease, such as chronic bronchitis, in nervo-sanguineous habits, with fever and permanently increased pulse, as well as acute rheumatism, in a similar temperament, reduced by a residence in Pau, to the standard, which brought them safely *under the influence of the sulphurous mineral waters* ; whereas, on the first arrival of the

patients, all the symptoms would have been most certainly, *materially aggravated* by their use.

The season for taking the different waters has been regulated by the Government, generally commencing on the 1st of June, and terminating the end of September. But July and August are the best months, particularly, for Barréges, St. Sauveur and Cauterets; for, from their great elevation above the level of the ocean, settled weather can hardly be depended on, in other months.

As in the taking of these waters with safety, it will be necessary that it be under the surveillance of a physician, it is not necessary here to give any hints, as to the regimen to be followed, the duration of the period during which the waters ought to be continued, and many other minor matters. These, depending so much on the state of each individual, must be regulated for him, on the spot, by the medical adviser, in whom he may place confidence.

CHAPTER XIII.

BAGNERES DE BIGORRE.

GENERAL FEATURES. ANCIENT HISTORY. CLASSIC REMAINS.
PRESENT STATE OF BAGNERES DE BIGORRE. OBJECTS OF
INTEREST.

WITH Bagnères de Bigorre we shall commence the particular description of those watering-places in the Pyrénées, to which we intend to confine our attention. We place it first in order, because the invalid may, after a winter's residence at Pau, if *ennuyé'd*, resort to it at an earlier period of the summer, for change of air, than to any other of the mineral stations in the mountains. It is situated at the foot of the Pyrénées, about thirty-five miles to the south-east of Pau, at the commencement of the smiling valley fertilised by the Adour, being neither in the mountains nor yet in the open country, but embraced by the last sloping and well-clothed coteaux, as they terminate in the valley. The temperature is not so high as at Pau, nor subject to such reductions as we experience, at an early period of the season, in other watering-places more distant from the plain. The mean temperature of the fine season, that is, from June to October, is stated, from the experience of many years, to be about 64° of Fahrenheit. Thus an

invalid desirous of change of scene, if an atmosphere more humid than Pau is not contra-indicated in his case, may, for instance, quit Pau for Bagnères in the month of May, while it might be attended by untoward circumstances were he at this early period, or even for five or six weeks afterwards, to take up his abode among the mountains. Another reason why we have given Bagnères the priority of description is, that in several cases of functional derangement and even of organic lesion, where at a later period the more active sulphurous waters of the higher regions of the Pyrénées are looked forward to as calculated to alleviate the symptoms, if not completely cure the malady, the waters of Bagnères act advantageously in preparing the patient's system for the reception of these stronger waters. Besides, there are many cases of mild functional derangement, not of an acute, aggravated, or obstinate character, which receive decided benefit from the waters of Bagnères themselves, independently of any assistance at a later period from others. There is also, in many respects, so great a similarity in some of the properties of its climate to that of Pau, namely, in its sedative influence upon irritation of the air-passages and general pulmonary apparatus, that patients so circumstanced, who have derived benefit from the climate of Pau, and whose intention it is to remain another winter or more there, will have the advantages, commenced in one place, sustained in the

other, without the drawback of the same high temperature. The change of scene also, tends to aid the influence of climate.

Although the history of Bagnères de Bigorre is lost in the obscurity of unlettered times, still there can be no doubt, that it is entitled to claim the honour of a very remote origin, since indistinct and dreamy tradition even dates its foundation at so early a period as seven centuries before the building of Rome, if we are to give credence to the authority of Père Laspales. But M. Salaignac, author of a work entitled *Cure des Eaux de Bagnères*, has mounted his Pegasus with an additional pair of wings, and soared far into the regions of mythologic lore to cull triumphs to adorn his favourite town, claiming for it an origin coeval with the wars of the giants, or at least the siege of Troy, when the impious rebels of Heaven cured by the mineral waters of the now called Bagnères de Bigorre, of wounds received in celestial conflict, in the incandescence of their gratitude founded the town, and have kept it in hot water ever since; or where Mars, wounded at the siege of Troy by the blood-thirsty Diomede, was quickly set upon his legs by the use of these waters, and lived comfortably with Venus for some time thereafter "all in the open air," but finding this an inconvenience with a small and rising family of little gods and goddesses, he commenced the nucleus of the now far-famed Bagnères de Bigorre.

It is equally well-known also, according to this and other veracious historians, that Hebe and Venus maintained the immortal freshness of their charms by bathing in the Pyrenean waters, and that they have left their influence still presiding over these mineral springs, particularly those of the Salut, which, something like the famed serpent-bath so graphically described in the *Bubbles from the Brunnens of Nassau*, convert disease into health, age into youth, and fifty into fifteen.

Although the great magazines of waters, which had given, for many ages, a character of importance to the town, were most probably coeval with the mountains; and from the time, however distant, that human beings were found clustered together in this district, their curative virtues might be partially known; yet there is no historic evidence of weight to throw any light upon the history of Bagnères at a period even much less remote than the one to which tradition has laid claim.

It is, however, presumed, that Bagnères had already existed a considerable time when Publius Crassus, the conqueror of Aquitania, received the submission of the Bigorrese, and gave to the town, according to the custom of the Romans, the Latin appellation of *Vicus Aquensis*, or village of the waters, which is equivalent to its present name of Gascon origin from *bagu*, a bath, and *agou*, water. The thermal establishments which the Romans

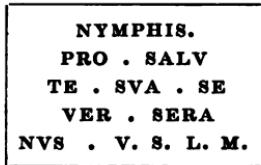
shortly after their occupation founded in this place, seem to leave no doubt that the town was already of considerable importance in the eyes of the conquerors, and that it was considered the head-quarters of the governing power.

There are few places into which the Romans carried their victorious arms, which do not, even in our days, display beneficial marks of their occupation. Time, generally the impartial destroyer of recollections, and the leveller of the proofs of ancient greatness, has respected in a surprising manner the traces of the power and influence of that people among all the nations over whom they held sway. Not only have the proofs of their genius in ameliorating, by the arts of civilization, the rude nations they conquered, come down to us, but their laws have given a sound foundation to the best devised codes of the most civilized nations of the present day; while their language still upholds the Roman empire over the mind, in making a knowledge of it binding upon all who aspire to professional honours, to the understanding the lucubrations of science, or to the position of gentlemen.

The Pyrénées, and particularly the high valleys which the Bigorrese inhabit, possess still many Roman remains. Those which have been found in Bagnères are more numerous than elsewhere; whence it may be presumed that the conquerors considered the town as the metropolis of those mountains, and

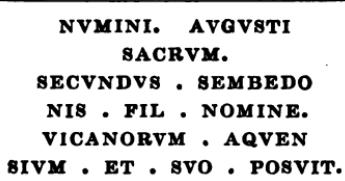
these remains may be received as good evidence of the sojourn which the Romans made in this town.

The most ancient of the monuments which Bagnères seems to have possessed from time immemorial, is a votive altar to the nymphs. It is attributed to one of the Roman generals who belonged to the first expedition in that part of Gaul. It remained a long time overlooked, having been placed at first in one of the walls which surrounded the town. M. Talon, however, who has a good museum and reading-room for the advantage of the visitors, has released it from obscurity and, perhaps, destruction, by having placed it over the door of his house in one of the most frequented streets of Bagnères, near to the great thermal establishment. The following is a copy of the inscription :—



Another monument, not less valuable in the estimation of the antiquarian, is a votive altar placed in the front of a temple, which the ancient inhabitants, with the view of conciliating Augustus Cæsar, after having rebelled against him, and been twice conquered, had raised to Diana, for whom that emperor entertained a remarkable veneration. This temple,

constructed between the left bank of the Adour and the right bank of the canal of the town, had been, on the introduction of Christianity in the fourth century, changed into the Church of St. Martin of Tours. It was demolished towards the middle of the seventeenth century; and the votive stone, on which was engraved the inscription which consecrated the temple to the favourite divinity of Augustus, was then placed on one of the fountains of the town where it is to be seen at the present day.



Bagnères preserves another votive stone, with an inscription to the god of battles. Like the two preceding, it may serve to fix the date of its erection, since it appears to be absolutely of the same epoch with that consecrated to the nymphs by Severus Seranus. This stone, discovered a little distance from the town, upon one of the heights which look to the north-west, forms part of a pilaster of the inner gate of the garden of M. D'Uzer. An ancient tradition has given the name of Cæsar's camp to the place on which it was found.

MARTI.
INVICTO.
CAIVS
MINCIVS
POSITVS
V. S. L. M.

*

At Campan also, two or three miles from Bagnères, a stone was found, one of the faces of which bears the following inscription:—

IMP . CAE
SARI . M.
AVRE . VAL.
MAXIMO.
ANO . PIO.

The two inscriptions which follow, graven on marble, were found near Bagnères.

A GHONI.
A . E . O.
CHONI.
AVLINI.
AVRINI.
V. S. L. M.

A . B . O
LABVSIVS
V. S. L. M.

It is believed that they belonged to the temple of the god Aghon, that is, good water, which had been

* The initials V. S. L. M. mean, according to some, *Votum solvit libenter merito*; and according to others, *Votum solvit loci manibus*.

dedicated to this divinity at the village of Asté, two miles from Bagnères. Such at least is the opinion of Bullet, in his Memoirs on the Celtic language, where he says that Aghon was a deified fountain; *Agh* signifying water, and *on*, good.

We find also, but of more modern date, the following inscription on the wall of the mineral fountain of Laserre in the town:—

HIC QUAM . NATURA . FECIT . MINERALIS DEFLUIT . UNDA. NEC . SALUBRES . MAGIS . HAUD . LYMPHÆ. NASCUNTUR . IN . ÆVIS. HAS . COLUERE . PATRES . CÆSAR. DUM . REGNA . TENEBAT.

Bagnères was thus limited in proving its ancient origin to be crumbling débris which time was every day swallowing up, till in 1823, when, on digging for the foundations of the present great thermal establishment, the magnificence of which, now sometime completed of marble, is highly honourable to the public spirit of the authorities, the workmen discovered some medals, with the effigies of Augustus, Trajan, and Marcus Aurelius. Stimulated by this discovery, the search was pursued with redoubled curiosity; and broken fragments of columns, with masses of mortar, harder than stone, enveloping pipes of lead, in a state of perfect preservation, were brought to view. Amidst the remains which had

been preserved with so much care, the greatest curiosity was felt to read the history of times long past; nor was the interest lessened when, at the depth of a few yards, a square pond, lined with polished marble and adorned with wrought mouldings, was discovered.

There could be no doubt, that in this place there had existed Roman baths, of which the fragments of the pillars and other ornaments attested the beauty. In following up the excavations, at a little distance from the former bath, two others were discovered, the lining of which, as well as the order of architecture, were similar. The bottom was laid with slabs, and bordered with seats. As the works proceeded, another one was discovered, which was elliptical or circular, but in its dimensions much greater ; since, supposing it to have been round, its circumference, calculated by the part of the circle already exposed to view, must have been forty yards. The seats were not in so good a state of preservation as those of the former baths, but were coated with a reddish cement, which, from its roughness, led to the presumption that they had been covered with marble. The bottom was overlaid with the same cement. Every one was impatient to see this precious relic of the importance which the Romans attached to these waters brought fully into view, and hoped that in the midst of remains, escaped through so many ages, a light might be found to

make clear the mystery with which the first origin of the town was shrouded. Necessity, however, prevailed. In following up these searches, the original object in making the excavations was for the time interrupted; but as it was urgent that curiosity, however laudable, should give place to utility, the further exploration of the rubbish was abandoned; and the Bagnerese saw with regret the earth again close over those classic evidences of her history, of which chance had revealed the existence. The designs also of the remains of an aqueduct, which had been constructed by the Romans for a thermal establishment, may be seen at M. Jalms, and which has been discovered sometime ago.

So often as it has been necessary to make excavations in Bagnères for useful purposes, it is not surprising that the pickaxe should, from such classic soil, release other equally interesting remains: thus, dedications to Hercules, to whom the Greeks also consecrated their hot springs, have been found in the neighbourhood of Bagnères.

It would be useless here to search deeply into the causes which made the thermal establishments of the Romans to disappear from Bagnères. It will be sufficient to allude shortly to the history of the Bigorre, from the time that they became subject to the Roman yoke to the period when, three or four centuries afterwards, shoals of barbarians, whom the Romans had long kept in check in the North,

spread themselves, like a pestilence, through the centre of Europe.

The yoke which had been imposed upon the hitherto free Bigorre by the conquest of Publius Crassus, the general of Julius Cæsar, as it might be expected, galled, not a little, men who had not been accustomed to drink the bitter draught of slavery administered by foreign hands. They, accordingly, made many attempts to free themselves from this bondage; but in spite of the most obstinate and brave resistance, they were again subdued by Augustus, the successor of their first conqueror.

Still, amidst this and other unsuccessful attempts for freedom, a better light was being gradually diffused amongst them. The arts of civilization, of which, fortunately for those vanquished by the Romans, they could not prevent the extension, produced a more contented spirit; and the ignorance and coarseness of the Bigorre, which were proverbial among their neighbours, yielded to a more humanizing influence, and their minds were, by a gradual transitive process, prepared for the more easy reception, in the end of the third century, of Christianity, which first planted its standard on the everlasting temples not made by hands,—the highest regions of the Pyrénées,—and speedily extended its drapery over the whole of Bigorre, even to Tarbes.

About this period the kingdom of the Cæsars fell before a colossal mass of brute force, dragging down

in its descent the useful institutions it had invented for itself and engrafted on other nations.

After a long series of conflicts and changes of masters, successively the slaves of the Visigoths, the Francs, and the Saracens, Bigorre settled down into comparative tranquillity. It was erected into a county, and became hereditary in the beginning of the ninth century, having been held under the kingdom of Navarre. Since then there have been many episodes of blood; some arising from internal quarrels, others from the ambitious designs of foreign aggressors. Nor can we omit to mention the cession in the fourteenth century of this and other provinces to England, the result of a long and bloody war, terminated by the treaty of Bretigny; and the subsequent resumption by the Crown of France, the equal consequence of sanguinary and long-continued conflict betwixt the two nations.

Public attention became more directed to Bagnères in the course of the fifteenth century. The fame arising from the multiplicity of its mineral sources, and the narratives of the wonderful cures performed by the use of its waters, commenced, and has continued steadily increasing to our days, in a variety of functional maladies, not of an over grave character. What a gloomy interregnum we have here, from the period when the Romans watched over the healing springs! Instead of the benign influence of those waters, directed to alleviate the

sufferings of humanity, we find their establishments destroyed, the virtues of the waters disregarded, if not altogether forgotten, and a succession of dark and sanguinary tyrannies, spread over many hundreds of years, destroying the products of intelligence, burying improvement in an almost hopeless grave, and inflicting the most signal calamities on human nature and on the progress of society.

From this time Bagnères became a place of general rendezvous, to which the Kings of Navarre transported their court during the season of the waters, and where flocked all that France contained that were illustrious and *distingués*. Bagnères, in a word, by the beauty of its site, and the salubrity of its numerous sources, became a place of fashionable resort*.

Montaigne, who paid Bagnères a visit, had given to it an éclat; and we find the following description of its condition at that time. We adhere to the old orthography of his period. “J'ay veu par occasion de mes voyages, quasi tous les bains fameux de la Chrestienté, et depuis quelques années ay commencé a m'en servir; car en general, J'estime le baigner salubre, et crois que nous encourons nos légères incommodités en nostre santé pour avoir perdu cette coutume, qui éstait généralement observée au temps passé quasi en toutes les nations, et est encore en

* *Bagnères de Bigorre et ses Environs*, par M. PAMBRUN.

plusieurs de se laver le corps touts les jours, et ne puis imaginer que nous ne vaillions beaucoup moins de tenir ainsi nos membres encroustez et nos pores estoupez de crasse. A cette cause j'ay choisi iusque cette heure a m'arrester et à me servir de celles ou il avait plus d'amenitié de lieu, commodité de logis, de vivres, et de compagnies comme sont en France les bains de Banières."

With regard to the appearance of Bagnères at this epoch, we are informed by contemporary historians, that it had its walls, bastions, towers, ramparts and drawbridges, and that the houses were closely and irregularly packed together, the streets crowded with dunghills and filth of all kinds, so that it fully required the well-tried qualities of the waters, and the general salubrity of the country, to overbalance those disadvantages, and make Bagnères what it was in those days, not only the rallying point of valetudinarians, but also of those who wished to preserve intact the good health they possessed.

Bagnères of the present day has indeed undergone great changes since the days of Montaigne.

There is perhaps no town in France which has greater attractions at first sight than Bagnères. As you approach it from Tarbes, which is distant thirteen miles, you have at first a very fruitful plain, then richly-wooded coteaux advancing in gradual undulation, encircling Bagnères, then mountain piled above mountain; and towering over all, in the ele-

vated horizon, the Pic de Midi at a height of 10,000 feet, stretching over the less elevated mountains in its foreground, as if peeping into the town.

On entering the town, one is very much struck with the well-kept macadamised streets, which are a great relief after the flinty streets of Pau, and the neat whitewashed houses, each vying with its neighbour in cleanliness and comfort both external and internal. It cannot be denied, that although Pau has had the advantage of an influx of English strangers for a period of twenty-five years, and which circumstance naturally tends to improve a town, remote as Pau is from the capital, in the substantial circumstances of cleanliness and comfort, still Bagnères in these respects is entitled to rank even before Pau. Its houses are commodious and modern, the gardens numerous and well-arranged, and its promenades on horseback and on foot,—the invariable accompaniment of advancing taste,—are chosen with great judgment, in reference to the varied views of mountain and precipice, of wood and water, and the far stretching valley of the Adour.

Bagnères contains a regular population of 8000 souls, exclusive of visitors; 4000 of whom it can also accommodate during the season, which commences in June and ends in October. It is entitled to rank as the second town in the department of the High Pyrénées. It has an elevation of 1600 feet above the level of the sea, and is beautifully situated

at the junction of the valleys of Campan and the Adour, snugly nestling at the very feet of the Pyrenean chains.

At the present day there are no disadvantages connected with Bagnères as a place of residence to the visitor in health; but many *agrémens* to amuse. His time can never hang heavily on hand, varying his occupations, as he constantly may, by excursions on horseback and on foot, *pic nics*, botanising, *chasséing*, and lionising among the never-ending varieties of scenery. In place of the bastions, towers, ramparts, and drawbridges of Montaigne's time, with the crowded and ill-ventilated streets, and dunghills into the bargain, we now see an open and smiling suburb admitting a free circulation of pure mountain air, through numerous streets, lined with a better description of houses than is found in other towns of much greater pretension, and infinitely more wealth and population, while the streets are refreshed by rivulets of water from the Adour, that line each side, and gallop on with a gay brattling merriness of sound. Theatres, concerts, and balls, fill up the evening occupations of those whose tastes so dispose them.

For the invalid, the great number of the mineral sources varied in their temperature and virtues, exert an alleviating and healing influence, supposing that his case has been properly chosen in reference to the properties of the waters. We shall afterwards

endeavour to lay down some discriminating rules to guide him in the choice or avoidance of these therapeutic agents.

“ It has been said of Bagnères*, that it is a town where pleasure has raised her altars besides those of Esculapius; and this is true, for it is only at Bagnères, among all the watering-places of the Pyrénées, that that kind of pleasure is to be found, which is usually sought for at a watering-place. Bagnères is, for this reason, by far the most frequented of the baths, because it is not resorted to by invalids only, but also by two other kinds of visitors, those whose slight ailments are compatible with the pursuits of pleasure, and those who are driven by the heats of summer, from the plains of France to the mountain air of the Pyrénées. Among this latter class may be ranked the great majority of the English who reside at Pau and its neighbourhood. It doubtless possesses many advantages both to the healthy and the infirm. Delightful drives and promenades, and the gaiety occasioned by some thousands of persons who have nothing to do, are sufficient attractions for the former; and the abundance, the choice and salubrity of the medicinal springs, are attractive enough to the latter.”

House-rent is considerably cheaper than at Pau,

* *Switzerland, the South of France, and the Pyrénées, in 1830,*
by H. D. INGLIS.

and much more so than at any other of the watering-places, and the necessaries of life in a corresponding ratio as to expense.

The objects of interest in the neighbourhood are the Elysée Cottin, a most retired hermit-looking spot, three quarters of an hour from Bagnères, where that authoress composed some of her works ; the Vallée de Campan, in the *exaltée* imagination of some, equal to the vale of Tempe ; the L'Heyris mountain, so famed for its botany, as to have received the flattering title of the temple of Flora ; the monastery of the Escaladieu, two leagues from Bagnères ; and a little further on the Toulouse road the Château of Mauvoisin, celebrated in the wars of the English, and connected with the exploits of the Black Prince. Also the ascent of the Pic de Midi, and the passage of the Tourmalet to Barréges ; the visit to Cæsar's camp in the neighbourhood, and the exploring of the various devious windings among the valleys, such as those of Labassère, Trebons, and L'Esponne.

Nor ought we to omit to mention the Palomière, on one of the heights to the north-east of Bagnères. These heights are crowned by a row of trees like an army in line, placed at distances of a few yards, and nets are attached to the trees along the whole ridge, while persons are perched aloft, some one hundred to one hundred and fifty feet, on perilous-looking cradles supported by poles

joined together triangularly at the apex. It so happens that during the months of September and October, flocks of wood-pigeons, migrating from the mountains, pass over these heights. When a flock comes in sight the persons aloft make noises which frighten the birds, and cause them to descend to the level of the nets, while, at the same time, they are fluttered by the representation in wood of birds of prey being thrown by the persons on the watch. They thus easily fall victims, getting entangled in the nets, which, being connected by a master-cord, close round them and prevent their escape. The sport being of a novel character, is sufficiently exciting to induce one to take the necessary exercise to witness it; and the view from the scene of operations is very fine; the valley of Adour on the one hand and the great Pyrenean peaks upon the other.

Mrs. Boddington*, who has described this sport with great spirit, says, "After wondering how the man gets into his basket, one wonders how he can keep himself from falling out; but there he sits, from early in the morning until dusk, keeping watch, sometimes without the slightest glimpse of a bird, and always, I should think, with a full view of danger; but he, I suppose, thinks otherwise. For myself, were an alternative offered me, and a choice imperative, I should prefer the Eddystone light-

* *Sketches in the Pyrénées*, vol. ii., p. 75.

house to this perch in the air, with the ground a hundred feet below, for there one has some sort of *terra firma*, though one may be stormed off or starved on it; but to hang in the air like a dead leaf, at the mercy of every random blast, is a position to which no effort of reason could reconcile me. But these men make nothing of it, and sit in the clouds as the tragic muse of Reynolds does in her chair of state, quite comfortably."

In the town itself, in addition to the various mineral sources, there are other objects of interest which may repay the trouble of a visit, such as the marble works of M. Geruzet, where all the varieties of Pyrenean marble, from seventy to eighty in number, may be found manufactured in varied articles of necessity and taste. M. Geruzet is an intelligent and polite man, and appears very willing to communicate what he knows of those marbles to strangers, and permits them to inspect the different processes of his extensive manufactory. Bagnères also is famous for its knitting, and ladies who are curious in these matters find an ample field for admiration as well as expense. The reading-room and museum of M. Jalon, and the well-stocked museum of M. Philippe, who has specimens of most of the quadrupeds and birds of the Pyrénées, preserved by his own hand, are objects of interest. The two large rooms also of the wings of the great thermal establishment contain many interesting

objects. The one is devoted to paintings, the greatest number of which represent the different Pyrenean views most celebrated for their beauty and grandeur. The second *Salle* contains various specimens of natural history. It has already methodically classed, for the study of geology and mineralogy, a very fine collection of rocks and minerals, illustrative of the mountains; and in the animal kingdom there are 2000 specimens of quadrupeds, birds, and insects, natives of the Pyrénées.

The promenade of the Salut, which commences near the centre of the town, and extends under the shelter of a double row of trees for the distance of three-quarters of a mile, is frequented from the hours of six to nine o'clock during the season with crowds of visitors in well arranged toilette.

CHAPTER XIV.

BAGNERES DE BIGORRE, CONTINUED. CLASSIFICATION OF THE
WATERS OF BAGNERES. THE FORMATIONS WHENCE THEY
SPRING. DESCRIPTION OF THE DIFFERENT SOURCES. TEM-
PERATURES. PHYSICAL AND CHEMICAL PROPERTIES. SYNOP-
TICAL TABLES OF THE CHEMICAL ANALYSIS OF THE PRINCIPAL
SOURCES.

BAGNERES DE BIGORRE and its neighbourhood possess a great abundance of mineral springs, more remarkable, however, in reference to their quantity than to any great variety as to quality; not fewer than forty-two *distinct* saline sources being claimed for Bagnères alone by those who, feeling a warm interest in everything connected with the prosperity of the town and the reputation of its waters, advocate their separate identity more enthusiastically than they are perhaps entitled to. Although the sources vary considerably in point of temperature, and in some degree as to the proportions of the mineralising principles which enter into the composition of their waters, still there can be little doubt that these numerous sources are modifications of a much smaller number. We, however, do not feel disposed to quarrel with these partialities, which are sufficiently natural, and which are not by any means confined to Bagnères, but are found influ-

encing and mystifying the real circumstance of other watering-places, not only in the Pyrénées, but all over the world.

Our duty consists in endeavouring to extract, by the aid of our own experience, from the mass of circumstances before us connected with the therapeutic action of the waters on disease, some conclusions which may really be useful to the invalid, and leave the marvels, which are claimed with considerable parade, to amuse the credulous and to keep hope alive. Although we consider the mineral waters of Bagnères to be the least efficacious of those of the Pyrénées where a strong impression is to be made in the cure of obstinate disease, still there is sufficient benefit derived from them in many of the ordinary functional derangements which, after all, go to make up the details of suffering among the generality of invalids, as to deserve some description. But we are free to confess, from our own impressions with regard to the curative powers of these waters, that were there none other of a mineral nature in the Pyrénées, and were not the climate of Bagnères highly auxiliary to their action, we should not think it necessary to enter into any particular description of them, far less to pass such an eulogium as might induce persons to leave England to partake of them with the view of deriving relief in any severe malady. We think that almost in any country, and most certainly in England, waters

quite as efficacious may be found, applicable to the same classes of disease, as those for which the Bagnères springs have been so warmly recommended; but as they form a part of a great system of mineral sources scattered over the Pyrénées, some of which exert a most powerful and in some varieties of disease a unique influence, and as they may be made auxiliary, antecedently and succedently to a general plan of treatment in relation to the stronger waters, they become of greater importance and require a more lengthened notice than they would otherwise deserve.

The mineral sources of Bagnères and neighbourhood are divided into 1. saline; 2. ferruginous; and 3. sulphurous. The saline sources are confined to the town itself, within the boundary of its ancient walls: the single ferruginous spring, *par excellence*, being half a mile from the town, although some trace of iron is detected in some of the saline sources: and the sulphurous, a solitary one also, is situated in the valley of Trebons at the distance of two leagues.

The saline waters of Bagnères de Bigorre are perfectly transparent and limpid, almost inodorous, of a mawkish taste, and communicate to the palate, in a slight degree, an astringent and ferruginous impression. Their specific gravity is a little higher than that of distilled water; and almost all, by exposure to the air, deposit carbonate of lime and

sesquioxide of iron. Those only which spring from below upwards, disengage a mixture of nitrogen, oxygen, and carbonic acid gases. Of the saline sources of Bagnères, some emerge from the heights, more or less considerable on the eastern slope of Mount Olivet, which overlooks the town on the west; and others spring up from the alluvial soil deposited by the Adour and its tributaries. The first class springs immediately from a rock of schistous limestone, surmounted by argillaceous schistus, and this again by masses of secondary amphibolique formation.

It has been said that these sources always have an invariable temperature, in all seasons and in all states of the atmosphere; but this is not correct to the extent claimed. Although the variation in their temperature is not great, still they do not always maintain an unvarying elevation. This variation is less observable, however, in the waters whose sources are mountainous than in those which spring up in the plains. In these the varieties of temperature are more frequent and considerable in consequence of their being more exposed to the infiltration of rain water; and of the cooling which they necessarily undergo in their passage, sometimes considerable, to their different points of exit.

The saline springs which we shall notice are twenty-two in number, viz., six which are found in the great thermal establishment, and the remainder which belong to private individuals.

<i>Thermal Establishments.</i>				<i>Fahrt.</i>
Dauphin ...	...			119°
La Reine ...				115
Roc de Lannes	29 Baths, 4 Douches, 1 Vapour-			113
St. Roch ...	Bath, and 2 Buvettes*			106
Foulon ...				94
Des Yeux ...				85
<i>Private Establishments.</i>				
Bellevue—10 Baths, 3 Douches	...	...	...	114
Carrere Lannes—4 Baths, 1 Buvette.				
1st Source	...	...	...	124
2nd Do.	...	...	...	114
Casaux—6 Batha, 2 Douches.				
1st Source	...	...	...	124
2nd Do.	...	...	...	114
Fontaine Nouvelle.				
Source de la Fontaine Nouvelle	...	...	...	97
Filet du Dauphin	...	...	...	111
La Guthière—10 Baths, 2 Douches	...	...	...	104
Grand Pré ...	...	...	...	95
Lasserre—4 Baths, 2 Buvettes.				
1st Source du Portail	...	...	...	118
2nd Do. ...	...	...	...	102
3rd Do. ...	...	...	...	102
Mora—2 Baths—1st Source	...	...	...	122
2nd Do. ...	...	...	...	90
Petit Bain—For the Baths	...	...	...	115
For the Douches	...	...	...	108
Petit Barréges ...	...	...	...	91
Petit Prieur—2 Baths.				
1st Source	...	...	...	100
2nd Do. ...	...	...	...	89
Pinac—6 Baths, 2 Buvettes.				
1st Source, supplying No. 1	...	...	...	107
2nd Do. supplying No. 2	...	...	...	92
3rd Do., called the Ferruginous	...	...	...	96
4th Do., du Jardin	...	...	...	96
Salut—10 Baths, 1 Buvette.				
Source de l'Ancien Salut	...	...	...	90
Source de la Montagne	...	...	...	90
Source de la Pompe	...	...	...	88
Santé—1st Source	...	...	...	88
2nd Do. ...	...	...	...	81
Théas—3 Baths, 2 Douches.				

* The fountains where the invalids drink the waters.

It is unnecessary to give any minute description of the individual sources. Generally, they have the same principles of mineralization, varied as to their relative component quantities, as will be seen by the tables which follow, and differing as to temperature, as has been already shown by the preceding catalogue. Although generally composed of the same principles, yet experience has proved, that they are not equally and indifferently applicable to the same diseased state of the system ; but that considerable delicacy of decision is necessary in applying the appropriate source, of which there are many shades, to the symptoms most usually benefited by its use ; while, on the other hand, not unfrequently have the symptoms been not only not ameliorated by an indiscriminate recourse to these waters, but have been very decidedly aggravated by a blind method of administering them.

The following division of the waters, in reference to their action upon the human system, has been proposed by Dr. Limmonier, after much consideration and experience of their virtues ; and as his views are reasonable, and accord with what we ourselves have observed, we adopt his classification*.

* *Bagnères de Bigorre sous le Rapport Médical et Topographique*, p. 59.

Table of the principal Saline Sources of Bagnères, grouped and arranged after their analogy of Medical properties.*

Stimulating Waters	A little ferruginous	Casaux. Théas. Danphin. La Reine. Petit Bain. Saint Roch.
	Scarcely ferruginous	Salies. Mora. Roc de Lannes. La Guthière. Laserre. Pinac, No. 1. Petit Prieur (hot source).
Waters which are intermediate between the two extreme classes		Fontaine Nouvelle. Pinac (the Garden source, and that called the Ferruginous.) Grand Pré. Versailles. Pinac, No. 3.
	Astringent	Source des Yeux.
Waters Tonic and Sedative.	Mild.	Salut. Petit Barréges, No. 1. Carrere Lannes. Santé. Petit Prieur (cold source).
	Emollient	Foulon.

The following are tables of the analysis of the different saline sources.

* The waters are supposed to be taken at their ordinary temperature. It is clear that their virtues must undergo change, if the caloric, one of the elements of the action of the waters, is modified.

TABLE I.
Analysis of the Saline Waters of Bagnères de Bigorre.—Water, a quart.

Substances contained in the Waters.	Source de La Reine. grs. q. ind.	Source de Dauphin. grs. q. ind.	Source de St. Roche. grs. q. ind.	Roc de Lannès. grs. q. ind.	Source des Foulons. grs. q. ind.	Soucre des Yeux. grs. q. ind.	Fontaine Nouvelle. grs. q. ind.
Carbonic Acid*	*	*	*				
Chloruret of Magnesium	*	*	0·130	0·104	0·224	0·142	0·196 0·158
Chloruret of Sodium	*	*	0·062	0·040	0·109	0·070	0·326 0·060
Sulphate of Lime	*	*	1·680	1·900	1·995	0·168	1·876 1·818
Sulphate of Soda	*	*	0·396	0·400	0·000	0·000	0·490 0·000
Sulphate of Magnesia	*	*		0·000	1·257	0·278	0·127 0·270
Subcarbonate of Lime	*	*	0·266	0·142	0·000	0·136	0·124 0·182
Subcarbonate of Magnesia	*	*	0·044	0·019	0·054	0·017	0·072 0·012
Subcarbonate of Iron	*	*	0·080	0·114	0·078	0·014	0·000 0·044
Fatty resinous substance	*	*	0·006	0·009	0·006	0·006	0·012 0·007
Vegetable Extract	*	*	0·006	0·008	0·005	0·008	0·012 0·004
Silex	*	*	0·036	0·044	0·040	0·031	0·040 0·044
Loss	*	*	0·054	0·020	0·024	0·036	0·052 0·039
Total	*	*	2·760	2·800	2·792	2·760	1·042 3·107 2·640

* The Gases which are disengaged from the Saline sources of Bagnères de Bigorre, are a mixture of Carbonic Acid, Oxygen, and Nitrogen.

TABLE II.
Continuation of the Analyses of the Saline Waters of Bagnères de Bigorre.—Water, a quart.

Substances contained in the Waters.	Source de l'Intérieur.	Source de l'Extérieur.	Bains de la Peyrie.	Bains de Grand Pé.	Bains de Versailles.	Bains de Sainte-Sauve.	Bains de Petit Prieur.	Bains de Carrere Lannas.
	grs.	grs.	grs.	grs.	grs.	grs.	grs.	grs.
Carbonic Acid	q. ind.	q. ind.	0·132	0·204	0·228	0·214	0·292	0·222
Chlorure of Magnesium	0·145	0·072	0·163	0·084	0·074	0·075	0·085	0·067
Chlorure of Sodium	0·430	0·308	0·890	0·788	1·560	1·596	1·712	1·576
Sulphate of Lime	0·960	0·300	0·000	0·000	0·000	0·000	0·000	0·000
Sulphate of Soda	0·000	0·308	0·000	0·000	0·000	0·000	0·000	0·000
Sulphate of Magnesia	0·000	0·000	0·236	0·380	0·328	0·396	0·316	0·324
Subcarbonate of Lime	0·138	0·240	0·248	0·396	0·508	0·260	0·344	0·260
Subcarbonate of Magnesia	0·010	0·018	0·068	0·052	0·064	0·059	0·050	0·058
Subcarbonate of Iron	0·040	0·022	0·000	0·128	0·028	0·000	0·000	0·000
Fatty resinous substance	0·008	0·009	0·004	0·005	0·004	0·008	0·004	0·004
Vegetable extractive matter	0·010	0·018	0·007	0·006	0·005	0·008	0·006	0·008
Silex	0·034	0·028	0·018	0·040	0·005	0·030	0·054	0·056
Loss	0·025	0·011	0·016	0·025	0·032	0·029	0·034	0·033
Total	1·800	1·334	1·620	2·780	2·872	2·583	2·897	2·608

TABLE III.
Continuation of the Analysis of the Saline Waters of Bagnères de Bigorre.—Water, a quart.

Substances contained in the Waters.	Bains de Cassaux.	Bains de Morn. Morn.	Bains de Théos.	Bains de Lasserre.	Bains de la Guthière.	Bains de Pinac.	Source de Petit Bain.	Fontaine de Salles.	grs.	grs.	grs.	grs.	grs.	grs.	grs.
Carbonic Acid	.	.	q. ind.	q. ind.	q. ind.	q. ind.	q. ind.	q. ind.	0·250	0·218	0·196	0·172	0·340	0·249	0·276
Chloruret of Magnesium	.	.	0·112	0·082	0·114	0·046	0·062	0·190	0·077	0·086	0·082	0·082	0·082	0·082	0·082
Chloruret of Sodium	.	.	1·716	1·563	1·852	1·832	1·876	1·896	1·708	1·821	1·716	1·716	1·716	1·716	1·716
Sulphate of Lime	.	.	0·000	0·000	0·376	..	..	..	..	..	..	..	..	..	..
Sulphate of Soda	.	.	0·478	0·284	0·000	0·408	0·036	0·287	0·344	0·362	0·160	0·156	0·230	0·160	0·276
Sulphate of Magnesia	.	.	0·050	0·036	0·022	0·002	0·036	0·076	0·052	0·050	0·098	0·028	0·018	trace	0·060
Subcarbonate of Lime	.	.	0·006	0·006	0·010	0·004	0·005	0·008	0·006	0·004	0·012	0·007	0·007	0·010	0·292
Subcarbonate of Magnesia	.	.	0·032	0·052	0·048	0·040	0·048	0·043	0·032	0·032	0·044	0·041	0·021	0·045	0·038
Subcarbonate of Iron	.	.	0·006	0·006	0·006	0·004	0·005	0·008	0·006	0·004	0·012	0·007	0·007	0·010	0·004
Fatty resinous substance	.	.	0·012	0·007	0·009	0·007	0·007	0·010	0·007	0·006	0·032	0·032	0·032	0·032	0·032
Vegetable extractive matter	.	.	0·032	0·052	0·048	0·040	0·048	0·043	0·032	0·032	0·044	0·041	0·021	0·045	0·038
Silex	.	.	0·044	0·041	0·045	0·021	0·032	0·045	0·018	0·018	Total	2·958	2·897	2·916	2·840
Loss	.	.	2·958	2·897	2·916	2·840	2·602	2·800	2·860	2·933					

2. *Ferruginous source.* There is only one ferruginous spring, properly so called, *la Fontaine Ferrugineuse*, situated ten minutes' walk from Bagnères, on the declivity of the same Mont Olivet, but further to the north, from which we have seen a considerable number of the saline sources to proceed. This fountain may be reached either by a promenade full of fine points of scenery, which winds to the back of the great thermal establishment, and which gradually ascends, so as to be practicable by the invalid, to the elevation of the fountain, 200 or 300 feet from the level of Bagnères. Or it may be approached by a more abrupt scaling of the hill on which it is situated.

The mineralizing principles which are held in solution in this water, evidently proceed from the decomposition of the neighbouring soil, which contains considerable quantities of amphibole and feldspath. The temperature of this source is very variable, as we may easily suppose, since the waters which supply it pass over the mineral beds, at very little depth below the surface, in which it resembles all other sources that vary in temperature, in proportion as their reservoir approaches atmospheric influence. In the month of August, 1839, at ten o'clock A.M., the temperature of this source was 62° , that of the external air being 71° ; on the 10th of September, in the same year, its temperature, at nine o'clock A.M., was 57° , that of the atmosphere being 63° . Indeed its temperature never rises above 64° , nor sinks below 52° .

M. Vauquelin analyzed, in 1817, this water, and found it contained oxide of iron, carbonate of potass, a portion of certain vegetable brown matter, a small quantity of carbonate of lime, of chloruret of potassium, and a little silex.

3. *Sulphurous source.* There is, properly speaking, only one sulphurous source in the neighbourhood of Bagnères which has acquired any reputation, viz., that of Labessere. It is situated at the extremity of the valley of Trebons, about two leagues from Bagnères on the right bank of the stream Ouessouet, at the feet of the great heights, which on this side form the pedestal of Mont Aigu. It springs, like the greater part of the sulphurous sources, from the point where the primitive formations, and those of transition, come into contact. The source is very abundant; the water is limpid, without a penetrating odour, and the flavour clearly sulphurous. It is, in consequence of its low temperature, less disagreeable to the taste than those of Cauterets and of Barréges, easy of digestion and passes quickly.

The following is the chemical analysis of a quart of water of this spring, as given by Patissier:—

Carbonic acid	.	.	inappreciable quantity.
Hydro-sulphuric acid	.	.	quart 0·062
Chloruret of Sodium	.	.	.grs. 0·206
Hydro-sulphate of Soda	.	.	do. 0·042
Sub-carbonate of Soda	.	.	do. 0·044
Vegeto-animal matter	.	.	do. 0·046
Silex	.	.	do. 0·018
Loss	.	.	do. 0·008
			—————
			0·384

CHAPTER XV.

BAGNERES DE BIGORRE, CONCLUDED. REMARKS ON ITS CLIMATE AS AFFECTING DISEASE. MEDICAL PROPERTIES OF ITS WATERS. MODE OF ADMINISTRATION AND ACTION OF THE WATERS. CLASSES OF DISEASE, FOR THE ALLEVIATION AND CURE OF WHICH THE INDIVIDUAL SOURCES, SALINE, FERRUGINOUS, AND SULPHUROUS, ARE SUITABLE.

THE climate of Bagnères, like that of Pau, exerts an influence of a decidedly sedative nature on health and on disease: and, indeed, from its great similarity in repressing irritation of all kinds, as we have before remarked, may be considered as the one to which invalids, who are anxious to continue the good effects which they may have derived from a winter's residence in Pau, should resort, in preference to any other of the watering-places of the Pyrénées. It is well sheltered from every wind, except a few points of the north, which seldom blows during the season of the waters.

The observations which have been made, with regard to the climate of Pau, apply, in many respects, to that of Bagnères. From an experience of four years, we express it as our opinion, that it is chiefly beneficial,—

1st. Where there is a pre-disposition to tuber-

cular irritation and softening, where the former state does actually exist, by lowering the tone of the arterial system, and diminishing the frequency of the respiratory number.

2nd. It is beneficial in tonic irritation of the mucous membrane of the trachea and bronchi, accompanied with dry cough, partial loss of voice, and viscid expectoration.

3rd. In cases also of tonic irritation of the digestive organs, accompanied with quickened pulse, eccentric developments of animal heat, emaciation, neuralgic pains, and acute affections of the joints of a mixed rheumatic and gouty character.

Dr. Farr, of Nice*, who spent two summers in Bagnères, thus gives his opinion of its climate:— “The climate of Bagnères is a decided one; it is anti-irritating and moist, depressing to the healthy, and has a tendency to allay irritation in every organ; and the pulmonary invalid soon finds that this is the kind of atmosphere he ought always to inhale; to him it is decidedly beneficial from the beginning; he escapes what the healthy never fails to experience, the seasoning common to all decided climates. The functions of each organ are more quietly performed; and the organ itself is soon brought into so tranquil a state, that any change in its structure originating in disease has a fair chance of being removed by

* *On the Climate of Nice, &c., p. 98.*

proper remedial means; he is, in fact, placed in the best situation to be treated: climate, however favourable, rarely does more than this. A patient coming to Bagnères with serious disease and deranged structure of lung, will feel the beneficial influence of the climate while he remains.”—“The season at Bagnères is short; the pulmonary invalid ought to arrive in the early part of June, and may remain till the end of September. The thermometer at that period falls in the evening to 50° of Fahrenheit; he ought then to take his departure for Pau or Rome. I would on no account counsel any invalid, who has derived benefit from the climate of Bagnères, to go to Nice, at least, not until I have fairly tested the valley under the Cimiez hills.”

The general action of saline mineral springs, independently of the interference of climate, is that of a mild stimulant to the mucous membrane of the stomach, soliciting a greater and an improved secretion of gastric juice, and thus restoring a healthy power of digestion enfeebled by organic torpor. The waters, if taken in sufficient quantity, stimulate secretion in all the organs, and thus relieve congestions of the nobler apparatus.

The kidneys are the first organs to feel the influence of the saline waters; the quantity of their secretion being very much augmented; and the diuretic effect more constant than the laxative. On the other hand, the lymphatic system testifies its

increased action by a more energetic process of absorption. This change in the secretions on the one hand, and the increased activity of the absorbent vessels on the other, produce very marked alterative effects, by which chronic congestions, which have their seat in the abdominal viscera, or in the lymphatic system, are diminished or altogether disappear, provided they are susceptible of being reduced by remedial agency; and the system is put into a state, in many varieties of disease, to be beneficially impressed by the action of the stronger sulphurous waters of Cauterets, Barréges, &c.

In certain affections of the skin also, the saline mineral baths effect considerable benefit, not only independently, but as a preparative to other stronger remedial mineral agents.

The saline waters have been found beneficial in muscular contractions, diseases of the bones and their articulations, and in chronic rheumatic affections. With regard to this last disease, it may not be useless to remark, that while as an attempted remedial agent, common hot baths diminish the energy of the skin and render it more liable to be acted upon injuriously by cold and humidity, the mineral baths, the saline particularly, stimulate the cutaneous system, and in adding to its vitality give it a re-acting power to resist atmospheric influences.

In taking the saline waters internally, the quan-

tity must have reference to the effect intended to be produced; if a purgative one, it will be necessary to take, fasting, a quart and a half to two quarts, dividing this quantity into three or more doses, and taking exercise between each. It is not unusual to mix some neutral purgative salt with the waters to aid their powers. They act mildly without irritating the organs of digestion, and instead of diminishing organic tone, rouse functional languor into energy.

Where it is wished to produce an alterative effect, the waters must be taken in smaller quantities.

The effects produced by the internal administration of the saline waters are rendered frequently more decided by their external application in the forms of bath and douche. Thus, a simultaneous impression is made on two great surfaces, the skin and the mucous membrane of the stomach and intestinal canal. It is in general prudent not to commence the use of mineral baths until the system shall have been for some time accustomed to the internal stimulus communicated by the waters*.

We shall now conclude this portion of the work on Bagnères de Bigorre, by giving a short detail of the classes of disease, which have been found by experience to be most suited to, and most benefited by, some of the individual sources. And here we acknowledge our obligation to the work of Dr.

* *Manuel des Eaux Minérales*, par PATISSIER.

Limonnier, which has assisted us in making the following short *résumé*.

In nervous diseases, such as hysteria, hypochondria, palpitations, and nervous spasmodic affections of the stomach, the waters of the Salut in bath are recommended; to which, if there be an atonic habit of body present, the waters of the ferruginous fountain may be added internally; if there be biliary derangement, the waters of Laserre may be alternated with the latter.

In loss or diminution of voluntary motion, viz., rheumatism, lumbago, sciatica, and paralysis, without injury of the brain, we have the following indications. In the case of an individual of small degree of excitability, the douche and vapour bath, and the baths at a high temperature of Casaux, Dauphin, La Guthière, Petit Bain, and la Fontaine de Laserre; while in one of a nervous temperament, irritable and predisposed to apoplexy and organic congestions, the baths of Foulon, Grand Pré, and No. 3 of Pinac, are indicated. The internal use of the Laserre water is often also associated with this external treatment.

In pulmonary catarrh, humid asthma, chronic laryngitis, we recommend No. 3 of Pinac, Foulon, Grand Pré, St. Roch, La Guthière, Laserre, the water of Labassere internally, made tepid, mixed with milk, gum-water, or other diluent.

In excessive discharges from some mucous canals,

tepid baths at first, graduated down to those of lower temperature, No. 3 of Pinac, Salut, and lastly des Yeux. Injections also of the waters of Labassere, and of the ferruginous fountain, are practised with great advantage; and these waters are also taken internally in these affections.

In diseases of the skin with bilious complication, or with any other organic affection, which contraindicates the use of the sulphurous mineral springs, the waters of Foulon, No. 3 of Pinac, à l'entrée de Laserre, in bath, and the waters of Laserre and Labassere internally, are recommended and taken with advantage.

In diseases of the abdomen, viz., chronic inflammation of the stomach and bowels, chronic diarrhoea, congestions of the liver and spleen, and chronic inflammation of the liver, we have the following course to pursue. If the affection depend on nervous irritation and a subacute state of inflammatory action, the waters of the Salut may be beneficially used externally and internally: if, on the contrary, it depends on an atonic state, or where there is little excitability in the system, the waters of la Reine, la Fontaine Ferrugineuse, or of Labassere, internally, are the appropriate remedy; if again it be complicated with bilious derangement, without any symptoms of inflammatory reaction, the same waters may be administered in addition to those of Laserre.

There are other functional irregularities in nervous, atonic, and in sanguine constitutions, for each class of which, some one or more of the saline sources are beneficial in a remedial point of view. We cannot well, however, in a work of this kind, do more than thus refer to them *en passant*.

CHAPTER XVI.

CAPBERN. GENERAL DESCRIPTION. SUCCINCT ACCOUNT OF ITS HISTORY. CLIMATE. STATE OF HEALTH OF THE NATIVE POPULATION. OBJECTS OF INTEREST IN ITS NEIGHBOURHOOD. PROMENADES AND RECREATIONS. ANALYSIS OF ITS MINERAL WATER. ITS MEDICINAL PROPERTIES AND MODES OF ACTION. THE PATHOLOGICAL CONDITION OF THE SYSTEM BENEFICIALLY INFLUENCED BY ITS USE.

ALTHOUGH the waters of Capbern, situated, as their source is, only ten miles from Bagnères de Bigorre, might, not only from this circumstance, but also from their composition being purely of a saline character, have been included among those in that district, still, from their unique action in a very important though limited section of diseases, we have considered them as fully deserving a special and independent notice *per se*.

Unlike, however, in their early history, the waters of Bagnères de Bigorre, those of Capbern boast of no Grecian or Roman trophies to indicate the worship paid to presiding deities, for cures performed in times so remote. Here we find no votive altars nor consecrated urns, nor inscriptions puzzling to the antiquary, nor carved columns, nor fragments of statues, although M. Megé asserts that these waters

were known to the Romans, and that they had given to them the name of *Aquaæ Convenarum**.

The imagination, however, loves to amuse itself with a traditionary legend of miracle and romance of a later epoch, which has reference to the occasion of restoring to the world, if not of discovering, the sanatory virtues of the Capbern waters. It is said, that on a time, at Capbern, lived a certain maid of the mill, who, although forty years of age, enjoyed a reputation far and wide for her beauty and freshness of complexion, and who was consequently the envy of her fair rivals of the district, eclipsed as they found their new-blown charms to be by her, who, although in middle age, thus flourished in unfading youth. They sought anxiously to discover how it was that time thus passed over her in vain ; for no wrinkle disturbed the serenity of her brow ; her hair retained its raven gloss, her eyes their killing fire, her gait its elasticity, and her figure its delicacy and grace. Her companions, however, on the watch, discovered her secret ; for at very early dawn, or in the deep gloaming, our heroine had been accustomed to steal unperceived to the solitary source, and renew her charms by drinking of its magic waters, and bathing in their juvenescing stream. But what secret will not woman, impelled by rivalry, penetrate ? So it was ; the maid was surprised, and, as

* *Statistique Générale des Départemens Pyrénées*, 1828.

may be expected, great was the afflux of candidates to the renovating spring, and wide spread the influence of its powers.

However this may be, we have evidence to prove that the waters of Capbern were known in the twelfth century; for in the charter of translation of the Abbey of the Escaladieu, situated in the neighbourhood, mention is made of the streamlet of Gourgé, which is partly formed by the mineral waters of Capbern, under the name of *rivulus Gurga qui Aqua Callida appellatur*.

Capbern, a village of the department of the Hautes Pyrénées, has a population of six hundred souls, and is situated four leagues north-east of Bagnères de Bigorre, four leagues from Tarbes, the capital of the Hautes Pyrénées, one league and a half east from Tournay, and one league south-west of Lannemezan. It is built on a small platform, through which the road from Bagnères de Bigorre passes to Toulouse, and which commands a most extensive view of the surrounding country. Its position, joined to the freshness of its vegetation, contrasted with the sterile Landes of Lannemezan, not far distant, had procured for it the name of Capbern, or green mount. The village itself is totally devoid of beauty, but is approached by a road which possesses, at every winding, a magnificent and varying vista of the Pyrénées, stretching out to the far east, and losing themselves to the eye in

a vapoury uncertainty. The undulating and festooned plains spread out below, in gigantic mosaic work, for many a league, until they join the romantic province of Languedoc ; while a mile-and-a-half off the road to the left, nestling in a contracted valley, or rather gorge, the *beau ideal* of solitude and tranquillity, the mineral sources of Capbern are found *welling out*, in great abundance, with their attendant thermal establishment, and the few houses which have, from time to time, been erected for the accommodation of visitors.

The fame of these waters seems to have been, for many generations, in unpretending unison with the quiet solitude of their source, and their votaries to have been confined to the peasantry of the neighbouring districts, who, however little qualified to philosophise upon the theory of their curative action, were no doubt sharp observers of results in a matter so important to them as a restoration to health and strength. One of the elements, and that not a trifling one, of the fame of the Capbern waters was, that they were an assured antidote to sterility, the philoprogenitive yearnings of the married fair sex not merely brought them to the waters as candidates, but, if disappointed, left them in the position of unfriendly critics ; so that it may be inferred in a degree, although not absolutely, that the waters *had*, on the whole, sustained their reputation, and that the ticklish ground which any such remedy must hold in

public estimation, had been strengthened upon trial. We are told by a good medical authority*, that “Tous les ans, en effet, on voit un essaim de femmes nouvellement ou depuis long tems mariées venir à Capbern, dans l'espoir d'y trouver le doux titre de mère; et bien souvent notre Naïade leur accorde cette faveur.”

So it was, that while the sulphurous waters of Barréges, Cauterets, Eaux-Bonnes, and Eaux-Chaudes had long secured for themselves an European fame, in many cases certainly not undeserved, the healing virtues of the Capbern waters were known but to a few; but by them preferred, in the cure of certain morbid ailments, to other more pretending and better supported mineral sources. But beneficial agencies, affecting human beings deeply in matters so personal as health, and perhaps more strongly still in the desire of perpetuating their family properties and names, are not likely for any length of time to have their influence confined to the meridian of a valley scarcely possessing a name; but, on the contrary, show the most natural tendency to extend their circles indefinitely, and include within their range an anxious host of votaries.

Long before the present comparatively spacious establishment of baths was thought of, the autho-

* *Lettres Medico-Topographiques sur Capbern*, par Dr. TAILHADÉ, p. 121.

rities of the Commune, to meet the increasing demand, had caused some rude buildings in wood to be erected, in which the sources were collected and dispensed to seven or eight baths. In so great request was the water, and so primitive the bathers in their feelings and habits, that it was not unusual to see a bath occupied by a number of persons of both sexes; as at some places in Switzerland, where twenty persons, and frequently a greater number, use the same bath, without being known to each other, and, according to the taste or caprice of the parties, indulge themselves in singing, reading, or the more substantial recreation of the *cuisine*.

During a considerable period, Capbern remained in this uncivilised state, because, no doubt, the qualities of the waters had not up to this time attracted philosophic attention, and their virtues were only empirically known to the peasantry. But their reputation steadily increasing, and the number of visitors in an equal ratio, the Government determined to erect a suitable establishment, where the sources might be more conveniently and advantageously collected and distributed with precision over a system of better arranged baths; and towards the end of 1817 this undertaking was accomplished.

This edifice, quite in character from its simplicity with its site, is built on the right bank of

a little stream which leaps with a merry sound down the slopes of the gorge to the base of the côteau, from which the waters have their source. The building is an oblong square, twenty-five yards in length, twenty in breadth, and five in height. The corridors of this building lead to fourteen bathing-rooms, spacious and well arranged; and there are also a douche, and two founts for the water-drinkers.

Since the construction of the thermal establishment, the accommodation for visitors has also improved in numbers and in quality. Three years ago, two hotels and a lodging-house, only moderately well appointed, received from one hundred to two hundred persons. Since then an hotel on a better scale has been erected, and a spirit has been called forth among the proprietors, sufficiently enterprising to supply accommodations for an increasing number of visitors; while at the village of Capbern itself considerable numbers may be lodged; and Bagnères de Bigorre is not too far removed from Capbern to prevent a person visiting it three or four times a week in fine weather, the exercise rather tending to assist the beneficial action of the waters.

The season, regulated by the authorities, for taking the waters commences on the 15th of June, and terminates the 1st of October, an official medical inspector being resident during this period.

Accidental circumstances, some years ago,

brought the waters of Capbern practically under the Author's observation; and subsequent researches into their curative virtues, and repeated and successful trials in cases of disease, for the cure of which they had long enjoyed a renown, have urged on him the conviction that they form an important link in the chain of the Pyrenean mineral springs, and that they, independently, are a powerful agent in the relief of many symptoms, in the treatment of which the other waters do not act at all, or with less decided and specific effect.

The Author's comparatively limited experience has been much strengthened by that of Dr. Tailhade, the inspector, who most kindly furnished him with the details of many cases which had officially come under his care. To Dr. Tailhade's *brochure*, also, on the waters of Capbern, and that of Monsieur Latour, of Trie, he acknowledges his obligations for many facts and hints.

The climate of Capbern is altogether different from that of Pau and Bagnères de Bigorre. In the latter we have an atmosphere sedative to, and corrective of, arterial activity; and the diseases to which the natives are liable assume symptoms more of a congestive than of an inflammatory character; while, in the former, the air is keen and stimulating to such an extent that, among the diseases which attack the native population, nine-tenths of them at least are marked with symptoms of high arterial disturbance,

and it is necessary in their treatment to have recourse to an unmixed antiphlogistic plan. The influence of the climate of Capbern in altering the lymphatic diathesis of the inhabitants of the villages in low and confined situations, who have removed to that place, has been a subject of observation and congratulation for ages: persons afflicted with goître being, after a few years' residence, without any other remedy than the change of air, entirely cured of this miserable disfigurement; and other maladies consequent upon a highly leucophlegmatic temperament are found to be equally modified and ameliorated, by a residence in an atmosphere so bracing to organic structure, and so stimulant of functional action.

The native of the district of Capbern is, consequently, muscular, active, and of a pure, unmixed, sanguine temperament. Unlike the Bearnois of Pau and immediate neighbourhood, whose equanimity it is difficult to ruffle, they are irritable to excess, and have a great tendency to display this in deed, as well as word. Nevertheless there is much hospitality and generosity found amongst them, and a chivalric probity practised in all their transactions.

The distinction also, between the natives of the two districts, is observable in the state of the arterial circulation, as indicated by the pulse; while that of the inhabitant of Pau and neighbourhood is slow,

equable, and soft, the pulse of the Capberner is quick, irregular, and full; and the influence of this state on the functions of the brain is equally symmetric, the latter being gay and quick of apprehension, and the former more reflective and calculating.

Before dragging the general reader into the details of analysis, or into the no less uninteresting relations with regard to the symptoms of disease favourably circumstanced for the action of the Capbern waters, we beg him to accompany us in a short excursive voyage of discovery in the neighbourhood of the source. Perhaps we may there find some points of interest, tending to relieve the tedium of such a secluded abode, and to assure him, that after he has fairly cleared the gorge, which is no herculean task, there is a world beyond him, and that not very distant, full of active ever-moving beauty; and even of scenes recalling associations of heart-stirring interest connected with the history of his own father-land.

By an easy ascent winding along the côteaux which embrace the baths of Capbern, we emancipate ourselves from the still dullness of the gorge and its limited horizon; and a few minutes' walk brings us in view of the lengthened panorama of mountains, with smiling plains and intersecting streams. Near the spectator on the right, situated on a rounded eminence, is the ancient fort of Mau-

vezin in ruins; still further on the same direction the famed L' Heyris Mountain, and the palomières of Bagnères de Bigorre, the scene of the *chasse* of the wood-pigeons, with a background of endless peaks, while in the lower parts of the landscape in the foreground, groups of villages are dotted over the face of the country, affording a pleasing relief to the eye, after dwelling on the rugged and frowning majesty of the great Pyrenean chain.

Should curiosity excite the visitor to extend his promenade, he can direct his steps to the Château of Mauvezin, a mile and a half distant; to the Abbey of the Escaladieu, three miles further on the high road to Bagnères de Bigorre; to Tournay, some four to five miles to the south-west; to Trie, twelve miles to the south; to Tarbes, thirteen miles off; and to Bagnères de Bigorre.

After traversing the small village of Mauvezin, we have, situated on an elevation facing us, the Château, the veteran remains of the exploits of the Barons of the country in the days of feudalism, and which played an important rôle in the history of Bigorre. "It merited," says Froissart, who travelled in Bigorre at that epoch, "its name of Mauvezin (*mauvais voisin*) during the period of its occupation by the English under the Black Prince;" for, to use the quaint French of this author, "sur la rivière de Lisse sied une bonne grosse ville fermée qu'on appelle Bagnères. Ceux d'icelle ville

avoient trop fort temps. Car ils estoient guerroyés et harriés de ceux de Malvoisin qui sied sur une montagne."

The Castle of Mauvezin was originally a dependence of the counts of Bigorre. Its original construction must be referred to a period very remote. In 1232 Bozon de Mathas gave it in pledge, and the Comte de Esquivat surrendered it in 1256 to Roger Comte de Foix. This fortress was considered so strong, as to be impregnable by the instruments of military warfare then in use, and was consequently the terror and the *dangerous neighbour*, as its name implies, of the adjoining country. Nevertheless the Duke of Anjou laid siege to it in 1373, and forced Raymond de l'Epée, the chivalrous lieutenant of the English, to give it up. The siege lasted six weeks, and the greatest bravery was displayed on both sides. Indeed the besieged were forced to surrender by the assailants having cut off the water which supplied their wells.

A continuation of the road to Bagnères de Bigorre for a few miles brings the stranger to the ancient Abbey of Escaladieu, situated in a lonely basin on the right bank of the river Arros, at the foot of the forest of Kersan. This religious establishment had been originally founded in the year 1236, by Forton de Vic, in the valley of Campan, between Grippe and St. Maria, but was transported in 1242 to Escaladieu, and there established under the pro-

tection of the Counts of Bigorre, who continued to be its munificent benefactors.

The severity of its rules and the rigid practice of austerities of the most mortifying description, acquired for the Abbey a high reputation, and the rich and poor, the warrior and the sage, those in fact who were disgusted with themselves or with the external world, flocked here to find a common retreat, and to attempt by penance and penitence to avert the anger of Heaven, for sins chiefly of commission; while by the enthusiasm of the monks, institutions, branching from it, were established in other lands. The Abbots Durant and St. Ramond, of the Escaladieu, founded the renowned monasteries of Yergo, Hittero, and Calatrava, and were their first superiors. The monastery of Calatrava, in Spain, gave rise to the order of chivalry of that name, whose distinguishing badge, the white scapulary, was worn by them until Benedict XIII. gave them a dispensation to discontinue its use.

It was at the Escaladieu, where the narrative of the life and miracles of St. Bertrand, bishop of Comminges, was drawn up, and on which he was canonized by the Pope Alexander III.

Petronille, Countess of Bigorre, famous among other things for having *used up* five husbands, to adopt the quaint phraseology of a biographer, wishing to retire from the world, towards the close of her life, chose the Escaladieu as her place of retreat,

where she died in 1251, after having made a curious will, where, in giving a detail of her debts, she makes mention, among other creditors, of a certain Vastel Gascon, of Tarbes, to whom she declared herself indebted in the sum of eighteen sous, for a pair of shoes which she had bought of him, and had sent as a present to the Queen of England.

This ancient abbey has undergone the fate of all religious establishments of this class, and has now passed into private hands: a M. Nerac, of Bordeaux, one of the few Protestants of Gascony, where Protestantism once raised her triumphant standard, has become the proprietor of this once stronghold of the most severe practice of Catholic orthodoxy. M. Nerac has fitted up, with great taste, a portion of the building as a residence, while the remaining parts of it are now a ruin full of interesting and pious associations. The chapel, however, still preserves some remains of its ancient sacred character, there being still found lingering within the hallowed precincts some statues of saints; and some *morceaux* of the gothic architecture of the middle ages are evidences of what it must have been, and of the desecration it has undergone from ruthless time and more ruthless man.

To the south, excursions may be made in the direction of Trie, where, a few miles from the town, may be seen in the plain the ancient château of Bonnefont, with its flanking turrets; and a little

further on, the château of Montastruc, placed on an eminence and looking misanthropical; both belonging to the period of the feudal times. The former had been, for a long time, the abode of the Marquis de Montespan, at the time when his wife was wantoning in the smiles of Louis le Grand. Near to this castle we are shown an old elm, in which is embedded an iron collar with a chain attached. The lightning having struck and rent the tree, brought to light this instrument of barbarian torture, which the elm had, perhaps ages ago, inclosed within its bark.

Proceeding further a few miles, we arrive at Trie, situated on the river Baïze Darre, a fortified town in the feudal times, for we still find vestiges of the gates, the turrets, and ditch. The ruins of a monastery, long ago the abode of Carmelite monks, are visited as objects of great interest, as having been the scene of a terrific tragedy connected with the wars waged by the Catholics against their Protestant brethren. Montgomery, the intrepid and ruthless chief of the latter force, having demolished the monastery, after having burned their records, hung the prior before the door of the chapel, and threw the other inmates, to the number of twenty, into the wells of the cloister. The chapel and the wells still remain; the former, with its vaulted roof, so justly admired, being now desecrated as a theatre.

One may vary the ride to Tournay, which is pleasantly situated on the river Arros, where was

formerly a convent founded by Raymond de Cordeilhac in 1625; and some miles further on is Tarbes. In another direction over the Landes of Lanne-mezan, the keen air may be wooed, as it passes over this sterile waste, unmodified by sheltering groves or warming vegetation.

To the lover of field sports there is ample recreation. The Landes are plentifully supplied with red-legged partridge, without much fatigue to the sportsman, and there is no one to say, "What doest thou?" The plain of Lutilhons, with its fields of millet, offer a rich supply of quails; and there is not a day in the month of September in which a sportsman, at all alive, may not return with his game-bag well filled. Hares are very abundant, and greyhound coursing in great repute. We find here also, in the season, great numbers of birds of passage, such as the wild duck, woodcock, lapwing, plover, curlew, bustard; but above all, quail and wood-pigeon. In the river Arros the angler will find remunerating sport.

After this cursory history of Capbern and its environs, we now proceed to speak of the qualities, physical, chemical, and medical, of its waters.

The physical properties of the waters consist in being perfectly limpid, inodorous, of a sweetish taste, and communicating to the throat a sensation of dryness. Left exposed in an uncorked bottle for months, the water deposits a great quantity of a

flocculent substance, without its appearing to be sensibly changed. Its specific weight, compared with that of distilled water, is 1·005. A thermometer plunged in the water of the source during half an hour, indicated a temperature of 76° of Fahrenheit, that of the atmosphere being 64°. The water flows in great abundance, and its volume is not influenced by any meteorological phenomena, it remaining the same at all seasons of the year, and there is a constant and continued disengagement of gas. The stone on which the water falls shows a slight sediment of a yellow colour.

As to the chemical properties of the Capbern water, Messrs. Rosier and Latour have analysed it, and have found that it contains, as to gaseous principles, carbonic acid, oxygen and nitrogen, and of fixed substances, certain organic matter, muriates of magnesia, of soda, and lime, sulphates of magnesia and soda, subcarbonates of magnesia and lime, carbonates of iron and lime.

According to M. Longchamp, the Capbern waters contain carbonic acid gas in great abundance, carbonate of iron, and a very small quantity of sulphate of magnesia. M. Save, on the contrary, affirms that they do not contain the smallest portion of carbonate of iron. He gives the following analysis*:

* *Manuel des Eaux Minérales*, par PATISSIER, p. 485.

WATER A QUART.

Carbonic acid gas	...	indeterminate quantity.	
Sulphate of Lime	...	...	grs. 0·92
Sulphate of Magnesia	...	...	do. 0·59
Chloruret of Magnesium	...	...	do. 0·01
Carbonate of Lime	...	...	do. 0·20
Carbonate of Magnesia	...	...	do. 0·01
Loss	...	...	do. 0·01
			1·74

In this analysis we find an illustration of the doctrine laid down in an earlier portion of this work, when treating generally of the therapeutic action of mineral waters, viz., that the quantity of chemical ingredients found in the composition of such waters does not, by any means, solve the question of the effects produced by them on the human system. It is quite certain, that ten times the amount of the same substances, discovered by analysis in the Capbern waters, may be artificially combined in any ordinary menstruum, and taken internally, still shall this combination not only not produce the entire effects usually resulting from the real waters, but scarcely any one of these effects. It is evident, therefore, that we must seek for some other solution than that which mere analysis supplies; and in this case it is not improbable that the peculiar powers of the waters may depend upon some vegetable principle beyond the reach of our analysis to discover. The markedly stimulating influence which the Capbern waters exert upon the

uterus, leads us to a conjecture, as to whether this may not depend upon the same or some analogous principle, which gives to the ergot of rye its powers over the functions of this organ; and whether the flocculent substance, deposited by the water after the lapse of time, may not be a new combination of some subtle vegetable entity which had eluded previous analysis.

In the present state of chemical science, however, we must be content with conjecture, and be satisfied, for our guidance, with the rules which may be inferred from an examination of the results produced by the use of the Capbern waters in different states of diseased action. And this, after all, is the knowledge that is most practical and useful.

Although the Capbern waters have been and are administered with good effect in all congestions of the brain, lungs, large vessels near the heart, liver, and spleen, and in chronic affections of the mucous membranes, accompanied with morbid and increased discharges, and in simulated consumption in young females, where we frequently find emaciation, hectic, oppression in the region of the chest, cough and even sanguineous expectoration, without the lungs themselves being organically affected, still, in our opinion, their proximate mode of action consists in their exciting a more vigorous circulation in the organs which have their site in the lower abdominal and pelvic regions;—in the uterus in woman—and

in the hæmorrhoidal system of vessels in man ;—and in both sexes an activity in the functions of renal secretion.

There is, as has been already observed, a phenomenon with regard to the action of the *sulphurous* waters of the Pyrénées, which is, that they act centrifugally on the circulation, from the centre to the surface, and even have the power of bringing hidden things to light, such as balls, pieces of wadding, cloth, or exfoliated bone, however deeply they may be lodged ; on the other hand the saline waters of Capbern exert an influence vertically on the circulation, by determining congestions of blood from the superior organs of the body towards the inferior, and creating safe outlets from the uterus, kidneys, hæmorrhoidal vessels, and mucous exhalants in the lower bowels.

It will be seen that waters possessing such unique properties are entitled to take an important rank among thermal springs ; for if we consider how various and extensive are the sympathies, for instance, between the uterus and every other tissue, and how intimately its derangements affect every moral and physical action, any remedy whose tendency is to strengthen and regularise its functions, must be viewed as materially adding to our means of alleviating present suffering and preventing future mischief. Again, under the pressure of advancing years, in the case of persons, the irritability of whose leading

organs has been worn out by sedentary pursuits, over-stimulation, or by residence in hot climates, where congestions of the brain, liver, and lungs, are either constantly present or alternate with each other, a remedy which has a strong inclination to relieve those weakened structures of blood, difficult to be circulated and consequently oppressive to the powers of life, must be hailed as a boon of value.

In all countries where the climate, being of a sedative nature, by reducing the vitality of important organs produces congestion in them, we find, particularly among the men, that haemorrhoids are hailed by them with great satisfaction, as a proof that nature has established this *depôt*, from which in case of a necessity threatening to life, an overcharged state of the circulation may be vicariously relieved.

The waters of Capbern then, where the necessity exists, produce a congestion of the haemorrhoidal vessels, not by any irritating process, but by some determining property of the waters, of which we can only judge by their effects.

Seeing then that the immediate action, in one class of morbid affections, is directly to invigorate the circulation through the uterus, it is easy to believe that the periodic secretion, only properly performed, in a normal state of this organ, will be reduced to a regular standard; and that sterility, frequently depending on functional error, may be, as it has been often, removed.

Where, in the one case, a secretion so necessary to the purification of the system, is either imperfectly performed or not at all, and when we consider the intimate relations the uterus holds with every structure; and in the other case, where from congestion in different organs, the blood loses much of its vitality; it is not difficult to conceive how varied and numerous may be the train of symptoms which may assume to all appearance the importance of separate and independent maladies; and, the physician who takes a narrow view of the case, may be idly coqueting with symptoms, when the original cause on which they depend may exist in full force.

The Capbern water is taken both internally and by bath and douche. The dose of the waters is from two to five or six tumblers, taken early in the morning, using exercise between the divided doses. Should the water not readily act on the kidneys, it should be taken more sparingly until this secretion be coaxed into more abundant action. It is remarkable that the waters in Bath produce the same effects on the system, although in a modified degree, as taken internally; the one materially assisting the other. The douche also, applied to the lower part of the abdomen and to the lumbar portion of the spinal column, is a valuable auxiliary.

The Author has been in the habit, in some complications of disease, of availing himself of the adjuncts of pharmacy. He has found minute doses

of iodine produce good effects, where, with other symptoms, there were present glandular swellings; and in the case of hardened enlargement of the liver he has combined a mild mercurial preparation with advantage.

The following pathological *résumé* of symptoms benefited by the use of the Capbern waters is the result of personal experience in many cases, and of a very extensive opportunity of consulting notes, published and unpublished, by Drs. Tailhade, Picqué, Peyriga, and Monsieur Latour. In all the cases he has examined, the following proposition has been decidedly borne out, viz., that the waters act beneficially, by altering and amending the circulatory functions in the lower abdominal and pelvic regions, even should the maladies appear *prima facie* not to be prominently connected with derangements in this quarter.

The morbid conditions of the female system, more or less dependant upon an irregular circulation through the uterus, distinctly benefited by the use of the Capbern waters, are the following:—1. Postponed menstruation from insufficient physical development. 2. The absence of the monthly period, depending on general and structural debility. 3. The same state connected with a congested condition of the uterus. 4. Excess of secretion, degenerating into hæmorrhage, arising from a general cachectic state of constitution, and a weakened condition of

the local blood-vessels. 5. In all abnormal discharges connected with the uterine system, chiefly occurring in leucophlegmatic temperaments. 6. In irregular distributions of blood in a chlorotic habit, showing itself in many a protean shape; such as pure hysteria; giddiness; partial or complete syncope; ill-conditioned ophthalmia; tetter eruptions; chronic catarrh with muco-purulent expectoration in increased quantity; irregular pains in the chest, with cough and even sanguineous expectoration, the stethoscope indicating no organic mischief; palpitation of the heart; beating of the aorta and cæliac arteries; irregular and capricious appetite; tumid abdomen and flabby swollen extremities, with emaciation and hectic.

In the many cases, the details of which the Author has had an opportunity of examining, and in those which he has personally treated, some of the symptoms enumerated above, and frequently nearly all, have been present. Occasionally two or more symptoms have been painfully prominent, and from their apparent intensity, such as in those connected with the chest, simulating consumption, the physician is liable to be thrown off his guard, and be induced to apply local remedies, which still more derange the circulation. Sometimes an irregular circulation in the uterus may not be suspected to exist to such an extent as to involve other and distant organs in a train of morbid consequences,

unless most minute attention be directed to this point; and such a state of things may only be inferred to have existed after medical treatment, from a comparison of all the circumstances, and from the amelioration produced by a particular line of treatment.

There is another diseased state of the uterus which deserves great attention; but the existence of which must always be necessarily obscure for many causes. The periodic flux is not a mere passive or active hæmorrhagic relief; but is a secretion, as much so as bile is of the liver, or tears of the lachrymal gland. It is very clear, therefore, that there may be as to time no irregularity of this function, but that there may be, from a debilitated state of the uterus, great aberration as to the quality of the secretion, or it may be no secretion at all; and as a properly eliminated secretion is absolutely necessary to a sane state of the general circulation, it is not difficult to imagine how many anomalous affections may result from a badly performed state of so vital an action. It is, however, gratifying to know that the Capbern waters are peculiarly adapted to this weakened organic state of the uterus; and generally with regard to the description of symptoms already given, we have found that they have yielded to a course of the Capbern waters properly pursued when they had resisted the usual medical means.

At the period of life when a second change is

about to take place in the female constitution, we have seen the inconveniences and dangers of such a period very much obviated by the use of these waters, by creating a substitution of action in the haemorrhoidal vessels, in the mucous exhalants, and by producing an increased renal secretion. They appear also to exert a tonic influence on the structure of the uterus, necessarily impaired by the change it is about to undergo. A lady upwards of fifty, recommended by the Author to take these waters, after a course of them exclaimed with enthusiasm, "Why, Doctor, the waters have made me young again."

2. There is another important section of disease, or rather diseased liability, for the cure of which these waters deserve to be lauded *par excellence*, and that is, in congestion of the brain, in persons of sedentary pursuits, of advancing years, and generally where the vital powers of the circulating machinery of the brain and other noble organs have been impaired from whatever cause. So decided are the effects of the waters in this condition of the circulation, that a friend of the Author's, who is an M.D., although not in practice, and who suffered from cerebral congestion, described the effect of a dose of the waters upon him to be, as if he felt the circulation of the blood to undergo a downward course, the head and chest being relieved, and a sense of fulness and tension experienced in the lower abdo-

minal pelvic and renal regions: and so convinced is a French gentleman (a man known as a *diplomat*) of their efficacy in apoplectic predispositions, that he has been for many years an annual visitor, and has expended 30,000 francs in proclaiming their virtues to the world purely from a philanthropic motive. Many years ago he had suffered from an apoplectic seizure, a repetition of which he feels has been warded off by the use of the waters of Capbern, of which, from the many cases he has seen cured, he is the interesting chronicler.

CHAPTER XVII.

BARREGES. ROUTE FROM PAU TO BARREGES. OBJECTS OF INTEREST ON THE ROAD. ROUTE FROM BAGNERES DE BIGORRE TO BARREGES, BY THE TOURMALET. HISTORICAL REMINISCENCES OF BARREGES. PRESENT STATE. ITS THERMAL WATERS. ANALYSIS. CLASSES OF DISEASE TREATED, AND STATISTICS OF THE RESULTS. ST. SAUVEUR. ITS WATERS. ANALYSIS. MEDICAL PROPERTIES.

WE now proceed to discourse of Barréges and its mineral springs; a place, to which much of the fame of the Pyrenean sulphurous waters may be traced; and to which, the other watering-places may, without disparagement, confess themselves indebted for the notice they have attracted and the rank they now hold among European thermal sources.

But before plunging *in medias res*, we feel ourselves bound to conduct the stranger thither, and by some description of the road, to endeavour to lesson the tedium of his short journey.

The distance from Pau to Barréges may be computed at forty-seven English miles, in a south-easterly direction, and the road, which is a royal one, is as good as the average roads in England, with the exception of some severe ascents as we approach Barréges, in the gorge of Pierrefitte and

the valley of the Bastan. Every second day, there is a diligence from Pau, which makes the journey betwixt the time of an early breakfast and a late dinner. Commodious voitures capable of containing six or more persons, may be hired at twenty francs a day, a convenient and agreeable mode of travelling, as it affords an opportunity of proceeding more leisurely, or of stopping to examine any antiquity or fine point of scenery, occurring on the road. By posting, which is well arranged, Barréges may be reached in a few hours.

The road from Pau, for many miles, displays nothing worthy of remark, except the high degree of agricultural cultivation, observable throughout, and the comfortable aspect of the population and their abodes. These latter are grouped into villages, which one after another line the road, and remind one of a similar state of things throughout the Vascongada provinces of Spain, where an analogous patriarchal race, the sons of the soil, congregate into masses for mutual protection and solace. This arrangement of the inhabitants has produced in each village in Bearn, or at least between those situated at some distance, a feeling of septship, regulating their intercourse, particularly in the important affair of marriage; persons being rarely found to contract alliances of this nature out of the pale of their own immediate districts.

As, each step, we approach nearer to the moun-

tains, we perceive them one after another developing themselves, and some starting forth in strong and separate identity, in all the luxury of foliage, which at a greater distance, were absorbed in one prevailing tint, forming, to all appearance, a severely compacted mass. The first and most prominent object, independently of scenery, is the Château of Coaraze, twelve miles from Pau, situated off the road, a few yards to the left, on an eminence, where Henri Quatre, confided to the sage counsels and tending of the Countess de Moissens, spent his boyhood. Here, left to the unsophisticated workings of a mind naturally good, and mixing with his future subjects in all their pastimes, and leading a hardy life, in no respect different from the peasantry, he acquired those moral and physical properties, which afterwards, shone forth in the just and sagacious monarch, and the valiant and indomitable general. The only remains of the old Château, are a tower, whose worn staircase suggests many interesting thoughts of the illustrious dead, who had, in life, during many ages, contributed their quota of friction to wear down the stubborn marble. A modern mansion now occupies the site of the old Château. It belongs to M. Dufau, Procureur-général of the Department, a gentleman of polite and obliging manners, and who readily permits the house and grounds to be visited by strangers. Occasionally, in the spring and autumn months, pic-nic

parties of English proceed to this place, to enjoy the delicious air, which is more exhilarating than that of Pau, from its proximity to the mountains.

Three miles further on we arrive at Estelle, famous far and wide among the natives of Bearn and Bigorre, for the Calvaire in its neighbourhood, to which countless masses, once a year, make a religious pilgrimage. Here also is the College of Betharan, for the education of priests, most romantically situated; and the traveller will be much struck with the appearance of a bridge, which crosses the Gave at this point, for the adornment of which, man has done as little as possible, and nature, by the simplest means, has done much.

Here we may be said to be, at last, at the feet of the Pyrénées, and the Gave, of which, since leaving Pau, we have had many furtive glances, now runs, clear as a precious stone, to Lourdes, close by the roadside, reflecting the shadows of the lofty mountains and the luxuriant foliage, which everywhere lines its banks.

Nearly midway between Betharan and Lourdes we find the town of St. Pé, of not much importance in itself, but interesting as having been the cause and the scene of bitter religious feuds, for ages, caused by overreaching priestly ambition. In the year 1032, a monastery was founded in this place, whose history, could it be here told, would deeply enchain the reader's attention. After many and

varying accidents, however, Montgomery, the Protestant leader, ordered the church to be burned: nevertheless, even to this day, the old monastery remains in tolerable repair, and is fitly inhabited by ecclesiastics who devote themselves to the education of youth.

From this place we continue our journey to Lourdes, six miles further, where the mountains may be said to commence, or at least where the first practicable entrance into their interior occurs to the traveller *en voiture* bound for Barréges or Cauterets.

The Castle of Lourdes occupies a commanding position. Situated on an eminence it is master of the town, as well as the gorge which leads through the valley of Argelas to the higher passes of the Pyrénées. The town, like many others in this part of France, is one of its most ancient cities; for, already fortified in the days of Julius Cæsar, it served to strengthen the Roman power. A square tower and certain walls and fortifications unquestionably of Roman construction, bespeak its antiquity.

The Castle of Lourdes*, after many changes of masters, was annexed, as belonging to the county of Bigorre, to the crown of France by Philippe le Bel, but after the battle of Poitiers, it came into the possession of the English. The Black Prince, who had arrived at Tarbes with his spouse the Princess

* *Album des Pyrénées*, par FOURCADE.

of Wales, had confided the garrison of the Castle of Lourdes, to the command of Pierre Arnaud of Bearn. About ten years afterwards, he conferred the government of the province on Jean, Lord of Grailly. This so exasperated the Bigorrese, that the Seigneurs and the chief towns revolted from the English and gave in their adhesion to the King of France. They joined themselves with the Duke of Anjou, brother of Charles V.; and greatly facilitated his conquest of the greater part of Bigorre; but the English, still masters of the fortresses, had a great superiority over their enemies. The Duke of Anjou, having become master of the Castle of Mauvezin, immediately laid siege to that of Lourdes. His efforts, however, failed against the courage and skill of its brave defender; and being most desirous to possess himself of this strong hold, he had recourse to Gaston Phœbus, Comte de Foix, cousin of Arnaud de Bearn, its governor. He promised him restitution of the county of Bigorre, of which Gaston pretended to be heir, if he would order his cousin to Orthes. Before leaving Lourdes, however, he invested his brother Jean with the command of the place, and made him swear to remain faithful to the King of England. Gaston Phœbus received his cousin in a magnificent manner, and loaded him with gifts, and on an occasion said to him, "The defence of Lourdes, garrisoned by the Bearnois, exposes me to the anger of the Duke of Anjou;

surrender therefore the place to me." "Count," said the loyal chevalier Arnaud, "I am poor, and I am your kinsman; but my allegiance is pledged to the King of England, and to him alone shall I surrender it." Upon this Gaston, losing all command of himself, drew his poinard and stabbed the chevalier. "Ah!" exclaimed he, "you have not acted with knightly faith; you have invited me as your guest, and you slay me." Gaston, far from repenting of this foul assassination, ordered his unhappy victim to be cast into a dungeon, where he perished of his wounds. This crime was useless to the Duke of Anjou; for Jean, brother of Arnaud, victoriously repulsed the hostile forces, and obliged the Prince to raise the siege. Later, at the period of the sanguinary struggle between the Catholics and Protestants, Montgomery attacked Lourdes. He took the town, but could not render himself master of the Château.

In still later days the Castle of Lourdes has been used as a prison for those taken in battle, and even during the wars of Napoleon, Englishmen have been made acquainted with its inconveniences.

At Lourdes we strike at once into the Pyrénées. Moving directly to the south, on entering the gorge which guards the valley of Argeles, a drive of two miles brings us fairly into the valley. For those who have seen this scene, or who intend to see it, description is supererogatory, as every one has

judged, or will judge, for himself. And for those who have not seen it, nor intend that gratification, we will merely say, that it is the only valley in the Pyrénées which we have had an opportunity of visiting that, we think, has not been overpraised.

At the bridge which crosses the Gave, a mile and a half from Lourdes, we leave to the left the valley of Castelloubon, so called from the castle it formerly possessed, and whose ruins are still to be seen: on the left bank, on the summit of an inferior range of mountains, we have the ruins of the castle of Géii; and nearer to the village of Argeles, situated eight miles from Lourdes, on an isolated hillock commanding the valley, the tower of Vidalos. Each of these castles have their individual histories and legends. As remains of the feudal times, without our even knowing their history, they are subjects full of imaginative speculation; and not the less so to a Briton, when he recollects, that many hundred years ago his countrymen had held wassail within these now mouldering walls.

Leaving Argeles, we pass to our right the Abbey of St. Savin, well worth a visit, whose foundation dates from a very remote period. On the left of Pierrefitte, three miles from Argeles, we have, on the opposite side of the valley, another feudal remain, whose ruins show that the original building must have been one of considerable dimensions and consequence.

At Pierrefitte there are two mountain-passes; the one on the left leading to Barréges, the other on the right to Cauterets. For the present we take the pass to the left, viz., Lavedan, which is four miles long, and opens upon the valley of Luz, with St. Sauveur, half a mile to the right. A steep ascent of four and a half miles finishes the expedition from Pau to Barréges.

Should the stranger be at Bagnères de Bigorre, and desire to proceed to Barréges by the shortest and most picturesque route, that by the Tourmalet is practicable after the middle of June. This mountain is 7000 feet above the level of the sea; and ere we reach its base, we have to traverse the valley of Campan, and the village of Grippe. The distance from Bagnères to Grippe is nine miles, and can be done without difficulty in an hour and a half. We then commence the ascent; and numberless cascades, thundering down their steep beds, meet us with deafening din. Here also we find the infant river Adour, cradled amidst the wildest majesties of nature.

Although the ascent may seem difficult, still it is really not so, being frequently made, even by timid females, in two hours. Should the day be fine, the fatigue will be well repaid. The Tourmalet, from its advanced position in the Pyrenean chain, commands an immense perspective of champaign country to the north, west, and east, taking in Bearn, Bigorre,

and Languedoc; while, from its elevation, it looks down on a troubled ocean of granitic and calcareous waves, which seem as if they had been suddenly petrified by the hands of their Creator. The loftiest peaks are here found either standing out in hard relief against the sky, or from a slight haze of the atmosphere, they appear filmy and buoyant; at another time for days no object, at the distance of a few yards, can be recognised from the thick mist, except when suddenly, and then only for a few seconds, the *brouillard* shall partly clear away, and through its semitransparent folds, the scene assumes an exaggerated and mysterious aspect. In the clear sunshine, on the one hand, we see an expanse of quiet cultivated beauty that the eye cannot take in from its vastness; and, on the other, the greatest contrast which imagination can conceive, of dilapidated serrated masses cleaving the air, without roundness of form or mark of vegetation, and here and there an everlasting glacier, projecting its prismatic rays.

The distance from the top of the mountain to Barréges is easily accomplished in an hour and an half; thus, with good mountain ponies, the excursion from Bagnères de Bigorre to Barréges may be done in five hours and a half; and time passes so quickly amidst such scenes that it does not seem to be an affair of three hours.

Although the stranger has heard much of Bar-

réges, and although it has been introduced upon the stage with somewhat of a flourish of trumpets, yet if he expects to find a fine town and pleasantly situated, he will be rather disappointed on a nearer acquaintance. Let him then picture to himself a village, 4000 feet above the level of the sea, composed of one street,—built on the shelf of a mountain, partly natural, partly secured by art, overlooking a noisy torrent, and surrounded by bleak mountains, usually canopied in mist,—and this is Barréges. It is pretty evident, therefore, that the inducements must be cogent ones, which could neutralise the disadvantages of so ungenial and *triste* an abode. The houses are sufficiently commodious, and can contain 1200 persons during the season. A part of the town, however, from its position in reference to a neighbouring mountain, is annually subject, during the winter, to be overwhelmed by avalanches, so that there is a gap left at this spot of a hundred yards, filled up in summer with houses of wood, but removed at the end of the season. Indeed before the winter sets in, the proprietors entirely dismantle the houses, even to the window sashes, and remove themselves into the plains, when the fashionable season for another description of visitors commences, *viz.*, the bears and the wolves.

Barréges, unlike most of the other thermal establishments, does not throw its pretensions far into antiquity; although there are local legends, which

place a knowledge of the healing virtues of its waters as far back as the tenth century. It is, undoubtedly, to the age of Louis XIV. that we must refer the origin of a substantial reputation. The Duke de Maine, son of that monarch, having been sent to Bagnères de Bigorre, under the care of Madame de Maintenon, in search of a cure for an affection, which had defied the skill of the skill of the capital, and having experienced but small relief from the waters, was recommended to substitute those of Barréges. At this time, no road led to this wild spot; but in order that the illustrious patient might be transported, the track over the Tourmalet, which still exists, was made. A frail low thatched cottage was the only shelter in the place, where now sixty spacious mansions, and a large military hospital, afford accommodation to all classes. It is said, that here Madame de Maintenon relieved her *ennui*, by composing the letters which have become so famous.

Louis XIV. was so surprised with the complete cure effected on his son, who was lame from a retraction of the right leg of long duration, that he ordered the construction of a new bath, to be called “le Bain de Maine;” and the reputation of the Barréges waters spread rapidly, and now continues to the point, that it is impossible during the season to procure a bed *en passant*, as occurred to the Author and a friend last summer, they having been even obliged to breakfast in a public passage.

The amusements consist in balls, promenades, and excursions. The former take place once a week or even more frequently; the facilities for promenades are very few; but, to make up for this, the excursions are various and full of interest. We may instance the ascent of the Pic de Midi de Bigorre, which is made with tolerable ease from the Barréges side, and is besides so much nearer than that of Bagnères, that one may more readily choose a clear day and be more certain of its continuing so. Then, there is the Pic de Bergons behind the town of Luz, from the summit of which we see, among a thousand other splendid morceaux of scenery, the most perfect *coup-d'œil* of the *Cirque of Gavarnie* and the *Brèche de Roland*, a panorama which well deserves of itself a pilgrimage of a thousand miles—then the excursion to Gavarnie itself about twenty miles off;—the castle of St. Marie at Luz, one of the last possessions of the English in this country;—the ancient fortified church of Luz, founded by the Knights Templars;—and the beautifully situated watering-place, St. Sauveur, half a mile from Luz, where one finds, at least, a less raw and piercing air than at Barréges.

The waters of Barréges* may be comprised into three principal sources, according to their states of temperature. The first and most abundant is named the *hot source*; that of which the temperature is in-

* *Manuel des Eaux Minérales*, par PATISSIER, p. 112.

ferior is called the *temperate*; and when it is still less, it is called *tepid*. These three sources supply 17 baths, two douches, and two large basins, of which, one is destined for the use of the military; the other for the poor. There is also a source reserved for the use of the drinkers.

The principal baths are, the Bain de l'Entrée, Grand Bain, Bain du Fond ; de Polard, and de la Chapelle.

The waters of all these sources are clear, limpid, and exhale an odour of rotten eggs ; their taste mawkish, nauseous, and oleaginous. Their surface is covered with a thin pellicle, which gives them an unctuous appearance, and they deposit this glairy substance on the side of the baths, and wherever the waters pass, in considerable quantities. This is the substance called barrégine or glairine, which we have elsewhere described.

The quantity of water, which these sources produce in twenty-four hours, would be sufficient to supply three hundred baths and fifty douches. The temperature of the different sources, is as follows :— Polard, 101°, the Temperate, 92°, Le Fond, 98°, La Douche, 110°, L'Entrée, 107°, La Chapelle, 84°, La Buvette, 107°, Les Piscines, 95° to 97°.

Several chemists have analyzed these waters ; but we owe to Monsieur Longchamp, the analyses most to be depended on. The water of La Buvette was that experimented on.

WATER (A QUART).

Nitrogen gas	quart 0·004
Sulphuret of Sodium	grs. 0·042100
Sulphate of Soda	do. 0·050042
Chloruret of Sodium	do. 0·040060
Silex	do. 0·067826
Lime	do. 0·002902
Magnesia	do. 0·000344
Caustic Soda	do. 0·005100
Do. Potassa	traces.
Barrégine	do.
Ammoniacum	do.

M. Longchamp has also given the quantity of sulphuret of sodium found in the other sources, viz., in a quart of the water.

Grand Douche	0·0498
Bain de l'Entrée	0·0393
Bain du Fond	0·0270
Bain du Polard	0·0270
Source Tempérée	0·0245

Having already, at great length, discussed the medical properties of the sulphurous waters, and their therapeutic action in disease, we have now only to point out how these principles operate in practice; and to this end, we shall give, taken from the experience of those who have paid a close attention to the subject, the results under several generic heads. The authorities on which we base our *résumé* are the Bordeus, who accumulated the experience of 2000 cases, and not merely did so, but philosophized upon them, and derived valuable general principles as their reward, while a grateful posterity presses for-

ward to honour the patience and science, which supported and illumined them in their difficult task. Our other authorities are, Dr. Pagés, the present able Inspector of Barréges, Dr. Ballard, Surgeon in Chief of the thermal hospital there, who has published an useful work on the waters, and Monsieur Gasc, appointed by the Minister of War, in 1829, to superintend the military hospital, who has also favoured the public with the results of his practice.

The following being the diseased conditions of the system, more particularly benefited by the waters of Barréges, we shall direct our attention entirely to them, namely, 1. Diseases of the skin with their varieties,—squamous, pustular, papular; 2. Affections of muscular, fibrous, tendinous, and membranous tissues, comprising, rheumatalgia, lumbago, sciatica, articular rheumatism, muscular retractions, ankylosis, white swelling, articular enlargements; 3. Deep seated irritation, arising from the presence of foreign bodies, collections of matter, carious bones; 4. Scrofulous and ill-conditioned sores, and fistulous ulcers.

1. *Squamous eruptions.* The symptoms of this order of cutaneous diseases depend upon a morbid action, originating betwixt the true and false skin, and which shews itself in an exfoliation of the latter in the form of scales, more or less aggravated and inveterate. This is most commonly a local affection of the skin, and but rarely connected with marked constitutional symptoms, but depending more on an altered state of action in the exhalant vessels.

These diseases show very varied appearances, ranging from the separation from the surface of the body of a dry cuticular powder, up to an exfoliation resembling the scales of a fish. In the different forms of lepra and psoriasis, the mineral waters of Barréges, taken internally, and by bath and douche, are most powerful auxiliaries of cure. In the milder cases, the tepid baths will often suffice, if accompanied with some alterative ptisan ; but, where the disease is more inveterate, and suspected to depend on, or to have its action complicated by some constitutional cause, preparations of mercury and arsenic, combined with the waters, rarely fail in producing great amelioration if not cure. It is a property of this, as of all other sulphurous waters, that they increase the medical efficiency of the remedies which are usually prescribed for diseases of a chronic character. In 260 cases of this class treated at Barréges, during five years, the following is the result :—136 cured, 85 received marked alleviation ; 33 showed no appearances of change ; and 6 were aggravated.

2. *Pustular eruptions.* In chronic ecthyma and its varieties, impetigo in its different forms, and men-tagra, the waters of Barréges, under a judicious system of constitutional treatment, produce good effects. Dr. Ballard*, on this subject, makes use of

* *Essai sur les Eaux Thermales de Barréges*, par J. G. BALLARD, Chirurgien en Chef de l'Hôpital Thermal de Barréges, p. 179 ; from which we have taken some of the statistic facts.

the following observations. "It is in this kind of alteration of the skin, that a general system of treatment ought always to accompany the use of the waters of Barréges. When these affections develope themselves, in persons of a sanguine temperament, bloodletting ought to precede all other means; the baths ought to be employed at a temperature not too elevated; for even thus administered the waters often produce an excitation, of which it is difficult to prevent the developement; but, which it is absolutely necessary to check at an early stage. When this excitation occurs, the most convenient means are, in the first place, to suspend the baths, and to apply lotions and emollient cataplasms, and to give cooling beverages. It is not until the diminution of all the inflammatory symptoms that the bath ought to be again employed. The same means are to be used, if, on a second trial, the same inflammatory phenomena show themselves, for not until the symptoms have thus undergone an alternative action, more or less frequent, can we hope to see these maladies disappear." The mentagra is that which offers the greatest resistance to the beneficial action of the waters. In 76 persons affected with the two first varieties of cutaneous disease, Dr. Ballard says that 36 were cured; 30 sensibly ameliorated; 6 shewed no change, and 4 were so aggravated as to oblige a suspension of the treatment.

3. *Papular eruptions.* In the different forms of lichen and prurigo, the good effects of the Barréges

waters are not so decidedly evident. It has been observed, that whatever good consequences have resulted in these affections, has been greatly owing to a combined plan of medical treatment. It is the opinion of those well-informed on this subject, that the waters of Cauterets are better suited to this class of cutaneous disease.

The following is a general *résumé* of the practice of Dr. Gasc, in cutaneous diseases treated in 1829 at the military hospital at Barréges. In simple herptic affections, the proportion of persons cured to those under treatment were 31 to 51; in pustular eruptions, 10 to 20; in furfuraceous eruptions, 14 to 18; in squamous affections, 7 to 10; in syphilitic, 1 to 5; in mentagra, 1 to 2; the only case of psoric disease under treatment was cured.

The maladies of the muscular, fibrous, tendinous, and membranous tissues, are generally ameliorated by the use of the Barréges waters, provided they are not of an acute type and in a nervo-sanguinous temperament.

1. Rheumatalgia,—that rheumatismal pain seizing different parts of the body, particularly the middle part of the limbs, or the larger muscles of the trunk, depending as it always does on a variety of original causes, experiences great benefit from these waters. In 300 cases noted with care, 125 were completely cured, 136 were very manifestly ameliorated; 35 only showed no improvement, and 3 were aggravated.

2. Lumbago.—Of 65 cases treated in a given time, 17 were cured, 40 sensibly ameliorated, 6 received no benefit, and in 2, from the action of the douche, inflammation of the kidneys and bladder supervened.

3. In articular rheumatism, when all inflammatory symptoms have passed off, and where there remain enlargement, weakness and rigidity of the joints, the waters of Barréges are essentially indicated, but if there be present any inflammatory symptoms, which may even have passed to the chronic state, they aggravate the disease, and the invalid quits Barréges in a worse state than on his arrival.

4. In muscular retractions, the sequel of rheumatism, the waters of Barréges produce advantageous results, and in wasting and trembling of the limbs from the same cause; out of 31 cases treated, in a certain period, there were 9 cures, 17 ameliorations, and 5 without success. In muscular retractions from tendinous and nervous injuries, the waters scarcely exert any sensible effect.

5. Sciatica. In 12 cases treated by Dr. Gasc, 5 appeared cured, and 7 more or less relieved.

6. Ankylosis. In nine persons suffering from this condition of joints, under the care of Dr. Gasc, of which six were false, and three true, five experienced remarkable amelioration; the sixth, and the three cases of true ankylosis, derived no sensible

advantage. Dr. Ballard says that in false ankylosis depending on deposits, the result of inflammation, or altered secretion of the synovial membrane, that the douche induces a decided absorbing and resolutive process, in the morbidly enlarged parts. He had experience in the treatment of 159 cases; of which 32 were entirely cured, 96 sensibly ameliorated, and 31, which showed no sensible change. It is, however, to be remarked, with regard to this and most other chronic affections, that the full benefits derivable from the waters are not always visible at the time of their administration, and that many of the cases, put down in different parts of this chapter, as having been only ameliorated, were, in fact, in an early stage towards a decided cure, at some period not very remote, as we have ourselves seen in frequent instances.

7. White swelling. Dr. Ballard gives the result of 21 cases treated by him; of these, 4 were cured, 10 ameliorated, in 6 no effect produced, and 1 aggravated.

Deep-seated irritation. From the centrifugal power which the waters of Barréges exert on the human frame, they have been found eminently useful in directing to the surface any deep-seated sources of irritation, such as,—1st, Foreign bodies lodged deep in the soft parts, as a musket-ball, pieces of cloth, &c. 2nd. Deep-seated abscesses. And 3rd, Carious bones, in whose exfoliation and discharge,

these waters act in a manner that may, without exaggeration, be called specific. Bordeu relates many cases of persons suffering from caries of the femur, vertebræ, ribs, clavicle, scapula, and humerus, &c., who had been entirely cured by the Barréges waters.

Ulcers. Bordeu, a high authority, says on this subject, "These waters have been always regarded as specific for the cure of ulcers. I have seen ulcers of every description and in all parts of the body, inveterate or recent, yield to their use. A Spaniard who had his legs much swollen and covered with old ulcers, of which I counted twenty-four on one leg, was cured in sixty days by the waters of Barréges, to which he had recourse, after having exhausted all other remedies."

On the same principle it is that old fistulous sores and ill-conditioned and languid scrofulous ulcerations derive benefit.

We have, we think, now said enough to convey a distinct view of the most prominent qualities of these waters. It has not been considered necessary here to enter into the minutiae of accompanying medical treatment and regimen. These, the able and experienced official physicians of Barréges will arrange for each individual, according to the necessities of the case. The object which the Author had in view, was to bring forward, before his countrymen, the claims of so powerful a curative agent, and

to point out approximately, the description of disease for the cure of which a reasonable hope may be entertained, and also of those which not only would not be benefited, but, on the contrary, aggravated, by the use of the waters of Barréges.

A league and a half from Barréges, in the valley of Luz, is St. Sauveur already referred to. From its waters being feebly sulphurous and thermal, they are considered auxiliary to those of Barréges as a preparative, or as a mild substitute, when the stronger sulphur waters create too great an excitement in the system. The accommodation being also cheaper and better at Luz and St. Sauveur, persons, whose maladies do not render a strict residence at Barréges necessary, may live here in a milder atmosphere, and resort daily to Barréges for the baths.

The village of St. Sauveur is very beautifully situated on a terrace which looks down from the height of two hundred feet on the Gave of Gavarnie. The thermal establishment is one of the finest of the Pyrénées; and eighteen well furnished houses afford accommodation to about three hundred strangers. The season commences in May and ends in October.

There is only one source, which supplies a douche, fountain, and sixteen baths in polished marble.

By analysis the water is found to contain nearly the same principles of mineralization as those of Barréges, but in a minor degree; a quart of the water, for instance, containing 0·025360 grains of

sulphuret of sodium, and the temperature averaging 94°.

These waters are very suitable, where the use of the sulphurous sources are indicated, for women, children, and invalids of a feeble and delicate constitution, complicated with irritability, and for nervous females debilitated by a residence in large towns, in spasmodic and hypochondriac affections, in incipient coughs, and in slight congestions of the liver and other abdominal viscera.

CHAPTER XVIII.

Luz to Cauterets. Passing Description of Scenery. Cauterets. Ancient History and Present State. Promenades. Objects of Interest in the Neighbourhood. Izzard and Bear-Hunting. Trout-Fishing. Description of the Individual Sources. Their Analysis, and Action on Disease.

LEAVING behind us Barréges and St. Sauveur, and the beautiful basin of Luz, verdant and sparkling at all times, from its luxuriant meadows and the streamlets which irrigate it in every direction, we turn towards Cauterets.

Of all the numerous basins one meets with in the Pyrénées, there are none, perhaps, possessing in such perfection so many and varied beauties, all harmonizing together, as this of Luz. It is surrounded almost in its whole extent, which may be three-quarters of a mile in breadth to a mile and a half in length, by mountains, some starting in perpendicular abruptness to a height of three thousand feet, bare, ragged, and dilapidated; others of less, but still considerable altitude, from which the perseverance of man has forced a coy but remunerating cultivation even to their summits. Stretching the eye down the gorge of Pierrefitte, amid the rude and mysterious grandeur of its granite and calcareous

walls, we have a *tableau* altogether faultless as to effect, and a parallel to which we may long in vain seek to discover.

The meadows in the more level parts of the valley of Luz, as well as all the practicable parts of the mountain sides, are maintained in a state of the richest colouring, even during a long continuance of drought, by means of mountain streams, which are everywhere turned to the useful purposes of irrigation. While we have seen in the plains of Bearn and Bigorre, during a dry summer, vegetation scorched almost to carbon,—in this valley we have spring encroaching upon autumn, all verdure and freshness. But however reviving to look upon, and however acceptable to the farmer, who reaps his three or four crops of hay, still as a place of residence for invalids, it has, on this account, manifest inconveniences. The sun's rays, acting upon the whole superficies of the valley, saturated at all times with wet, not merely produce inevitable evaporation to a great extent, but a distillation also of vegetable principles, which cling to and are wafted on this loaded air. Particularly towards the setting of the sun, we perceive a haze to creep along the valley, and the damp chilliness engendered, mixed with these exhalations, do not render Luz the most desirable abode in the Pyrénées for persons of a delicate and sensitive organization.

In other respects, Luz is a very pleasant resi-

dence, the natives being orderly and civil; and the prices of everything, particularly house-rent, are more moderate than at the other watering-places.

To proceed from Luz to Cauterets, it is necessary to retrace our steps, through the gorge of Pierrefitte to that village, which is the common centre from which the Barréges and Cauterets roads diverge up their separate passes. As we omitted any description of the former, as we passed on to Barréges, we shall here give the words of an author*, who has written well on Pyrenean scenery and manners:—"Proceeding down the Lavedan, we enter the gorge which separates the exquisite basin of Luz from the valley of Argeles. There is not a more magnificent defile in the Pyrénées than this; certainly not one, through which the timid may wend his way in more perfect security; and, free from all sensation of danger, contemplate the grandeur and majesty of the pass. It is one of those places which never palls upon the sight, visit it as often as we may, there is always something new to be seen, some feature we had not discovered; or those with which we were familiar, wearing a different aspect, are still as novel and interesting as at first. The sides of the defile are precipitous mountains, rising at first perpendicularly from the bed of the river, but afterwards

* *A Summer in the Pyrénées*, by the Hon. J. E. MURRAY,
vol. ii., p. 91.

having just sufficient slope to permit the box and heath, and various other shrubs and bushes, and a profusion of wild flowers, to hang upon their steeps, even where there appears not a particle of soil to yield them nourishment. The numerous twists and bendings of the defile are still more interesting. There little ravines appear, down which the waters from the upper valleys are seen descending, half hidden in the foliage of the ash and oak trees, which skirt their torrents and bend over them; while far above are caught glimpses of the higher regions of the mountains covered with pines. · The road by means of which alone the traveller, nay, even the peasant of the district has been enabled to enter this extraordinary scene, has been a work of prodigious labour. For almost the whole length of the pass, it has been formed by blasting the precipice into galleries two, three, and sometimes four hundred feet above the river, sometimes forced by an elbow of the mountain to cross to the opposite precipice, there to be forced back again by a still greater obstruction. These crossings and re-crossings of the stream add greatly to the picturesque beauty of the defile; one moment we are in a spot to which the sun's rays scarcely ever find their way; in the next, we have them beating down upon us in all their splendour; and from the centre of the many marble bridges of one arch, which span the dark abyss, the full grandeur of the scene is developed.

Such is the gorge of Pierrefitte ; fifty years ago, an izzard could not have clung to its sides, now carriages of all descriptions pass along the fine road, which has been constructed through it*.”

At Pierrefitte we emerge from the gorge into the valley of Argeles,—again, after passing through the village, to enter that of Cauterets. “The scenery along this route is somewhat similar to that of the gorge of Pierrefitte, although not to be compared to it in magnificence. The gorge of Cauterets is more open ; the road does not always hang over its torrents; and the gentler beauties, the little grassy platforms, which now and then appear in it, studded with magnificent trees, may render it more pleasing to many individuals than the savage grandeur of the gorge of Pierrefitte.” (p. 95.)

Six miles of a gradual but not very rapid ascent conduct us to Cauterets,—a town of a solitary but picturesque site, containing a stationary population of eight hundred persons. It is said that one thousand strangers have been lodged in Cauterets. It differs from the Eaux-Bonnes, Eaux-Chaudes, and even Barréges and St. Sauveur, by its greater size, and the extreme abundance and variety of its mineral

* Since Mr. Murray wrote this, a gigantic undertaking had been commenced by the Government, by which the road will be lowered in some parts 200 or 300 feet. The work is now considerably advanced ; and it is expected to be completed this year.

sources, not being merely a place for summer sojourn only, but a nice, clean, well-built, and well-sheltered little town, where, during the winter months, something else in life except bears are to be found. Its winter is not so severe, as one would expect, from its being perched so high in the air, viz., 2900 feet above the level of the sea.

But before describing Cauterets, as we find it at the present day, we shall cast a rapid glance back on its origin, and on the early knowledge which existed as to the healing qualities of its waters.

Some three or four hundred feet high, above the present town of Cauterets, and clinging to the rapid descent of one of its environing mountains, there still exists, and still is held in deserved estimation, one of the many sources which here abound, viz., that of "Cæsar." It derives this dignified name, as local history and tradition inform us, from its having been honoured by the notice of Julius Cæsar, and from its having contributed to the cure of some ailment of that distinguished general.

That this source must have been regarded as of great account, is evident from the circumstance that the town, which is now built in the basin formed by the surrounding mountains, a locality well sheltered and easy of access, was originally for ages, and until a century and a half ago, composed of a few habitations only, surrounding and ancillary to the *source de César*, chosen evidently from no other motive

than that of proximity; for it seems almost a miracle, at the present day, with all modern appliances, how the many lame and decrepid persons are transported to this elevated spot. Since then, however, matters have changed. New and varied sources having from time to time been discovered, the votaries became more divided in their homage, and Cauterets took a downward march to a more tenable position, and has gradually developed itself, until it has become a sprightly little town of palaces, where the marble of its native mountains is found to lend its aid very prominently towards its adornment.

An early *prestige* was also given to Cauterets, from the “Source des Espagnoles” having cured Abarea, the first king of Arragon, of some grievous malady; and in later times from the patronage bestowed upon the waters by the witty Marguerite, queen of Navarre, sister of Francis I. She conferred upon one of the sources the poetic appellation of *Fontaine d'Amour*, which, alas! has now degenerated into the less interesting one of Bruzaud. Here during the season the brilliant court was held, and Cauterets became celebrated as a place, where the evils which oppressed the body, or the clouds which obscured the sunshine of the mind, might be equally dispersed by the magic of its waters, and the *spirituel* and chivalrous diversions of a captivating court.

Here, too, was Henri Quatre, in his younger days, accustomed to recreate himself; and persons

the most illustrious in rank, in science, and in arms, have, in all periods of its history, up to the present time, been found amongst the galaxy of its visitors.

Cauterets of the present day is composed either of hotels or private houses, which are all to be let out as apartments ; and it must be allowed that the proprietors know very well how to make the most of them ; for, with the exception of the Eaux-Bonnes, of which place we shall speak hereafter, house-rent at Cauterets is higher than at any other watering-place in the Pyrénées ; the price demanded, and often received in the best situations, being from three to five francs a day *per room* for even a lengthened period. From the crowds of invalids and tourists who flock from all parts, it is desirable even to bespeak apartments sometime before they are absolutely wanted ; for many, for whom these waters are most decidedly indicated, have been obliged to quit Cauterets in bitter disappointment at the impossibility of finding accommodation.

The environs of Cauterets abound in charming sites ; and the promenades, for those in health, may be very much varied. For the invalid, too feeble for excitement, there is the velvety park, with its sheltering trees, running the distance of a mile, parallel to the Gave, and displaying, here and there, some beautiful peeps of scenery. Here he may sit during the day in complete shelter from the sun, and inhale the invigorating air, as it comes freshened

down the mountain passes ; but should his strength increase, small is the exertion necessary to make more lengthened and what would seem highly laborious excursions. By the aid of a *chaise à porteur*, a species of sedan, born by two sturdy mountaineers and two relays, almost all the lions of the neighbourhood may be visited, — a hurried account of which we shall now proceed to give.

There is a spot in the neighbourhood of Cauterets, three-quarters of an hour from the town, to which people resort, by a gradual ascent of 600 to 800 feet, called the Grange de la Reine, partly out of respect to the memory of the illustrious dead, and partly on account of the favourable medium position for taking a view of the surrounding scenery. Here Queen Hortense, wife of Louis, king of Holland, returning from Luz, over the mountains, was benighted and halted. Beloved by the people of the district, from her open-handed goodness and gracious manners, they have attached a sacredness to the spot. However, the house that sheltered this amiable princess is only a shepherd's cottage ; but the view is very fine. One does not take in a vast horizon, as from the top of its neighbour, the Monné; but there is the basin of Cauterets, with its mountain walls, some thousands of feet in height, with their black pine clothing,—the gorge leading to Pierrefitte,—and a distant vista of the valley of Argeles, almost to Lourdes.

But the hardy and adventurous visitor, desirous of seeing the best dissected map of the Pyrénées, in this part of their chain, as well as of enjoying an horizon of immeasureable extent, may ascend the Monné,—a mountain in the immediate vicinity of Cauterets. Let him choose a good guide, a strong pony, and clear weather; and if he wishes to have the scene in perfection, let him start early enough to enable him to reach the summit before sun-rise. From this summit the most culminating of the Pyrénées are visible, and many of the most famed objects of interests. Directly to the south is displayed the amphitheatre of the Lac de Gaube, the numerous cascades careering down the Vignemale, the pinnacle of the French Pyrénées, and its resplendent glaciers; to the south-west of the glaciers the Camales and Higuencle, the soaring limit between France and Spain; to the west the bifurcated summit of the Pic de Midi de Pau; on the verge of the horizon, to the south-east, Marbore and the Brèche de Roland, and its majestic towers; and further on, and in the same direction, we see the ice-capped Mont Perdu, with a thousand other peaks and crests, differing in form and elevation, but producing a *coup d'œil* which strikes the spectator with astonishment and awe. To the north open out the vast plains of Bigorre and Bearn, and many lands besides, extending so far into distance that no definite horizon can be distinguished.

The excursion most in vogue, and one which myriads come far and near to make, is that to the Pont d'Espagne and Lac de Gaube. There is, unquestionably, nothing in the Pyrénées, as to scenery, at all equal to this; for Gavarnie cannot properly be brought into competition with it; since the latter is so unique as to offer no corresponding points, by which a comparison could be justly made. Gavarnie stands alone in the architecture of nature.

The road leading to the Pont d'Espagne and Lac de Gaube is through a deep and broken gorge, along which the Gave rushes with impetuous force over precipice after precipice, causing an innumerable succession of cascades, some of them of surpassing grandeur and beauty; for we have not merely the cascades themselves, but, looking down upon them from the road, which winds along the rocky sides of the Gave, the chasms, on a sunny day, are spanned with the most richly developed rainbows, the offspring of the sun and spray, projected to a grand distance. Throughout the course of the Gave, for miles, its channels seem to flow with milk, so complete and constant is the agitation. Then add to this the cone-shaped mountains clothed with the black pine to their needle-pointed summits, starting up to a sudden elevation of 6000 feet from where you stand, with rugged and luxuriant filling-in of the foregrounds; and the reader may readily suppose that there are materials for a marvellous picture.

Four or five miles of this scenery bring us to the Pont d'Espagne, which cannot be described either by pen or pencil. It has conveyed to our mind similar sensations to those experienced, from hearing the awe-inspiring music of Weber's *Freischutz*. Two miles further on is the Lac de Gaube, the source of the Gave, whose gambols, on being set loose, we have just alluded to, reposing amidst solitude itself at the foot of the Vignemale, the highest mountain of the French Pyrénées. The lake is small, and, as a piece of water, is not worthy of particular notice; it is the frame which girds it that gives it its charm.

There is still another excursion to be made from Cauterets which will well repay the labour, and one, strangely enough, very rarely undertaken; it is to the Lac d'Estom Soubiran, through the valley du Lutour. In the valley, for eight miles, we have the rudest and wildest scenery to be found in the Pyrénées; then, after passing a noble cascade, curiously studded with pine-trees, we arrive at a lake called the Lac d'Estom. Here, in the month of July, two years ago, when two friends accompanied the Author on this occasion, we found ourselves in the neighbourhood of the snow regions. Nothing could be more bleak or desolate than this spot. No vestige of a human habitation, or of human beings, with the exception of two goat-herds who had, in the summer months, spent their youth and man-

hood in this desert, and recollect not one party during fourteen years who had proceeded to the upper lake. However, being determined to make the attempt, we induced one of the goat-herds to guide us, and commenced the ascent of one of the most uninviting mountains in creation, a near neighbour of the Vignemale, and little inferior in height, where our first essay at ascending was over a bridge of snow, with a torrent running beneath. After two or three hours of toilsome labour, we gained one of the crests of the mountain, and had the satisfaction to see on the other side, many hundred feet beneath us, the Lac d'Estom Soubiran completely frozen over; and this in the south of France, a few miles from Spain, and on the 6th of July. The surrounding scenery was very wild, and of a different character from anything we had previously seen in these mountains. The two gentlemen who accompanied the Author were good specimens of the curative powers of the Cauterets waters in chronic laryngitis; for, so much benefited had they been by a few weeks' residence and use of these waters, that they made this toilsome excursion, through every descending degree of temperature from summer-heat to freezing, without any return of their malady; and both had been cases of considerable duration.

The sportsman will in the neighbourhood of Cauterets, among the lofty summits in summer, and much lower down in the autumn and spring, find

ample sport in hunting the izzard and bear. Mr. Murray* on this subject says:—"There are some of the best *chasseurs* of the mountains, natives of Cauterets, and it is one of the places where I would recommend those who are fond of such wild sports as izzard and bear-shooting, to establish themselves for a fortnight towards the end of spring, and where I can assure them they will have themselves to blame, if they do not meet with success. There is no scarcity of izzards upon the neighbouring mountains, and the bears, not now so plentiful as they were, are still to be found among the pine forests, which lie between the Vignemale and the Pic de Midi de Pau. Jean Lestapis (still at Cauterets) is the most successful *chasseur* and the best guide in this district. Few seasons have passed over, in which Jean has not been able to increase the number of notches upon the stick which records his victories over the bears. Implicit confidence may be placed in his honesty, sagacity, and hardihood."

Trout-fishing is the only sport the Gave furnishes. The trout differ in each stream as to flavour and colour; those of Lutour and Cambascou being blacker. The salmon-trout of the lakes is the most valued. We cannot resist quoting the authority of Mr. Inglis*, who says, "How charming a spot would it be for

* *Summer in the Pyrénées*, p. 95.

+ *Switzerland, France, and the Pyrénées*, by H. D. INGLIS, vol. ii., p. 180.

the disciple of Isaac Walton ; for the Gave of Cauterets is a stream, the sight of which would make the heart of an angler leap for joy. It is neither too large nor too small, neither too limpid nor too dark, neither too rapid nor too slow, shaded occasionally by high banks, but not shaded by trees. But it possesses two drawbacks nearly fatal to the enjoyment of a thorough angler. The fish are so numerous as to insure a nibble at every cast, and so simple-minded and credulous, that every nibble proves a take. I am almost ashamed to add, since I am speaking to sportsmen, that the trout of the Gave of Cauterets are admirably done in the frying-pan."

Now as to the chief object of this chapter ;—namely, to lay before the reader the properties of the Cauterets waters, and their influence on disease, we remark at the outset generally, that here we find, pent up in a small space, plentiful specimens of almost all the other sulphurous waters scattered over the extent of the Pyrénées. We have sources, even more powerful than Barréges, and some which very nearly resemble them ; waters possessing the virtues of those of the Eaux-Chaudes and Eaux-Bonnes, and even preferable to them in their exhibition, as oppressing the stomach less, and passing more easily off by natural exits ; and springs, shading from the most powerful stimulant down to the mild and soothing sulphurous waters of Petit St. Sauveur.

It must be evident, that in the treatment of disease, it is highly advantageous to be armed with varied instruments of power to combat varying symptoms; for frequently, in the thermal treatment of maladies, it is necessary, from idiosyncracy, and the changes which occur during the process of cure, to discontinue the use of some one source, and to substitute another of stronger or milder properties, according to the necessities of the occasion. It is, too, often highly desirable, to commence a course of the waters, in certain sensitive and irritable states of habit, by administering a milder source; and when the patient's system has become accustomed to the stimulus, in a modified form, to advance upon the more vigorous plan of operations called for by the emergencies of the case. Cauterets supplies this desideratum perfectly, and is therefore the watering-place which we are in the habit, during the season, chiefly of frequenting ourselves and, *caeteris paribus*, of recommending to others.

There are other circumstances connected with local position and climate, which, in our opinion, give Cauterets a preference over the other chief sulphurous watering-places of the Pyrénées. Its climate and topographical position, for instance, are preferable to Barréges. Cauterets is upwards of 1000 feet lower than Barréges, is better sheltered, has a less keen raw air, and is not subject to the constantly recurring fogs, which infest the latter,

and which penetrate with the greatest perseverance, in the shortest space of time, to the skin, as we have had an opportunity frequently to experience. The air of Cauterets, again, is more bracing than that of the Eaux-Bonnes, and, except in cases where a sedative atmosphere is indicated, such as in tuberculous irritation of the air passages or lungs themselves, where the Eaux-Bonnes are very suitable, is more conducive to the favourable action of the waters, in the great majority of diseases, for which invalids resort to them. Further; the locality of Cauterets is more open than that of Eaux-Chaudes, and is sheltered from any partial gusts of wind; whereas in the latter, we have a current of air, almost constantly blowing down the narrow gully of Gabbas, highly detrimental to all persons predisposed to organic diseases of any of the noble viscera, particularly the lungs, or suffering from ailments arising in constitutions of diminished irritability, and enfeebled vital energy. There is another important circumstance also which may here be properly mentioned; that the thermal temperature of the Cauterets waters is considerably higher than that of the sources of the other watering-places mentioned, an element of no small philosophic as well as practical value, in thermal therapeutics.

Cauterets possesses eleven independent sources, five of which are situated to the east of the town, viz., La Reine, Caesar, Rieumiset, Bruzaud; and

Pause; and six to the south, namely, La Raillère, Le Petit St. Sauveur, Le Pré, Maouhourat, Des Œufs, and Les Bains du Bois.

Before entering into a description of these individual sources, we think it better to give an analysis of one of these, and that perhaps the most in requisition, namely, La Raillère; and as the principles of mineralization are nearly the same in all, varied chiefly as to temperature, and the quantities of sulphuret of sodium that enter into their composition, a statement of these differences, applicable to each source, will convey a sufficiently precise idea of their chemical composition.

In a quart of the Raillère water there are* of

Nitrogen gas	quart	0·004
Sulphuret of Sodium	gr.	0·019400
Sulphate of Soda	do.	0·044347
Chloruret of Sodium	do.	0·049576
Silex	do.	0·061097
Lime	do.	0·004487
Magnesia	do.	0·000445
Caustic Soda	do.	0·003396
Barrégame	traces.	
Caustic Potassa	ditto.	

Temperature 104° Fahrenheit.

The following quantities of sulphuret of sodium are contained in the other sources, and their temperatures are given.

* *Manuel des Eaux Minérales*, par PATISSIER, p. 129.

	GR.	TEMPERATURE.
Source des Espagnoles . .	0·0334	... 122°
— de Bruzaud . .	0·0385	... 104°
— de César . .	0·0303	... 124°
— de Pause . .	0·0303	... 115½°
— du Pré . .	0·0159	... 120°
— du Bois . .	0·0140	... 122°
— Maouhourat . .	0·0124	... 131°

LA RAILLERE.

This source, although not entitled to rank as the most ancient of the Cauterets springs, had yet achieved for itself, a considerable time ago, a paramount reputation, in a class of diseases, which, in Great Britain at least, seem to be on the increase, viz., chronic affections of the different mucous membranes, but more particularly of the air passages: and at the present time, the crowds of anxious invalids who press to its establishment from all parts, and the great proportion cured to the numbers under treatment, fully attest its claims to be considered a remedial agent more efficacious and more to be depended upon, than any, which mere pharmacy guided by the most enlightened science, has to offer.

The establishment of La Raillère is situated a mile from the town, on the road to the Lac de Gaube. The ascent to it is fatiguing to a debilitated person; but with a *chaise à porteur*, the hardy mountaineers trot up the acclivity with him in an incredibly short space of time. All the operations of water-drinking

and bathing take place from four in the morning till nine or ten o'clock A.M. But when the influx of invalids is great, and the cases are those requiring baths, it is not unusual to hear the bustle of departing and arriving relays of bathers during the whole night.

The thermal building of La Raillère contains twenty-three *cabinets de bains*, a fountain for the water-drinkers, and an ascending and descending douche, a large peristyle in marble arches, and an extensive terrace in front to take exercise on, either in dry or wet weather.

It is necessary when an invalid arrives at Cauterets, to take the baths, that he put himself in communication with the physician inspector, Dr. Buron, who will inscribe his name, and fix upon the hour at which he can be accommodated. The invalid has then a claim upon the bath for this hour as well as for a *chaise à porteur*, until the close of the course of waters which may have been recommended to him.

The external physical features of the Raillère waters are those common to the sulphurous waters of the Pyrénées generally—their chemical analysis we have already given. We shall now, therefore, say a few words as to their undoubted medical properties, and as to the *tissues* on which they exert their most favourable action.

The different mucous membranes in disease, is the pathologic condition of the body, on which the

Raillère water acts with peculiar energy,—and its curative powers have been brought to bear most extensively on chronic affections of the larynx, trachea, and bronchi. Not merely, in simple atony of this membrane, arising out of a generally cachectic state of constitution; or where from an aberration of function we have secretion in excess, and that of a muco-purulent and sanguineous kind; but even in an obstinately chronic condition of parts, where the structure itself has become partially affected with ulceration, we have seen, and we have had undoubted evidence to satisfy us from the experience of others, that the waters of La Raillère, aided and alternated with those of Maouhourat, have produced decided and permanent cures, in an incredible proportion of cases. But these states of the membrane must not be complicated with tuberculous deposits in the lungs, *in a state even of incipient activity*. Whatever may have been said or written, as to the curative powers of the Pyrenean waters, in tuberculous consumption, the Author is decidedly of opinion, that, whenever tubercles have made a stage, however small, in advance of their passive state, the sulphurous mineral waters of the Pyrénées will excite them to further progress. But it does not necessarily follow, that the waters of La Raillère are always contra-indicated, where tubercles may be suspected to be either in process of deposition or in an inactive state. The derivative influence of these waters, from

deep-seated parts to the mucous surfaces, will tend to check a further deposition of tuberculous matter in those structures, and throw more activity of circulation on a safer surface.

From the record of cases, which we have had an opportunity of examining in this branch of disease, we have no hesitation in asserting with confidence, that many cases, simulating consumption most closely, except in the absence of stethoscopic indication of tubercles in activity, have been checked in their progress, which if left to the usual curative means of art, would speedily have involved the cartilaginous structure of the air-tubes in an ulcerative process, and roused into cachectic ulceration, the substance of the lungs themselves.

Indeed, so much confidence have we in these waters of La Raillère and Maouhourat, in affections of the mucous membranes generally, that we consider their beneficial effects may, in a great degree, be depended upon, provided disorganization has not proceeded to an extent for which there is not in nature herself any reserved powers of restoration; or where the affection is not mixed up with some other malady contra-indicating the use of the waters.

These opinions have not been loosely formed, but have the support of the ablest physicians who have had experience of these waters; we may cite the Bordeus, who accumulated a record of 2000 cases arising out of their experience of the Pyrenean

waters ; Camus, who has written a pains-taking work on the subject ; Dr. Buron, who has been inspector for sixteen years ; and lastly, Orfila, the greatest authority of the present day, who passed several seasons at Cauterets, for his own health, and who published his opinions in the *Dictionnaire de Médecine*, 2nd edition, t. vii. p. 39. Speaking of La Raillère, he says, "that the waters are administered in chronic bronchitis ; in the *earliest* stage of tuberculous consumption ; in certain hoëmoptyses ; in pulmonary neuralgia ; and in gastralgia. This establishment," says he, "is the most frequented, and is the one which renders the greatest benefit to the invalid."

PAUSE.

This establishment is well frequented, and contains eleven *cabinets de bains*, a fountain and douche. "These waters," says Monsieur Orfila, "are particularly useful internally, both in bath and douche, in chronic rheumatic affections, in cutaneous maladies, in inveterate catarrhs, in humid asthma, in certain kinds of secondary syphilis, and in several lymphatic diseases."

CÆSAR.

A very old establishment, containing three baths, a douche, and a fountain.

LES ESPAGNOLES.

A splendid thermal establishment of marble is now in course of erection to utilise this source. It

will contain every improvement that modern skill can devise.

Both these latter sources fulfil nearly the same indications as that of Pause. Occasionally, they are found to be too energetic, and ought only to be employed in persons of a low degree of irritability. They are administered with advantage in paralysis, unconnected with cerebral congestion or lesion ; in painful affections of bones ; and in inveterate lymphatic diseases. These waters are, both from their temperature and the proportion of sulphurous principles, the most powerful of the Pyrenean springs, and, therefore, require to be prescribed with judgment, and their action watched with care.

LE BOIS.

This establishment, which is situated in a very elevated position beyond the Raillère, is commodious and well-arranged. It contains two *piscines*, or large baths in marble, four *cabinets de bains*, with a douche in each, and beds for the invalid, who, may desire to encourage the profuse perspiration produced by the bath and douche. These waters are pre-eminently in use in rheumatic gout, in nervous temperaments where all inflammatory symptoms have disappeared, and in several cutaneous disorders.

LE PRE,

Is an old establishment, having sixteen *cabinets de bains*; and a douche of great power, the proper-

ties of the waters being nearly the same as those of Le Bois.

BRUZAUD.

This establishment has twelve *cabinets de bains*, and a douche, capable of being applied with graduated degrees of force. "This water," says Monsieur Orfila, "is employed, with advantage, in dissipating abdominal engorgements." We have known in passive hepatic congestions, from weakened functional action, the application of the douche to the region of the liver remove this state of things, by exciting a more vigorous circulation through this organ.

MAOUHOURAT.

The waters of this source are drunk in the rude cave, where they spring out of the granite rock; man having not in this case interfered with nature. Monsieur Orfila says of these waters: "They are above all things advantageous in the chronic maladies of the digestive apparatus, marked by the absence of irritation. Gastralgia and dyspepsia resist for a very short time only the action of these waters, which we take internally. Their great reputation is sufficiently proved by the eagerness with which invalids flock to it, difficult as it is of approach, from its distance from and elevation above Cauterets." We willingly join our testimony to this statement. We have never met with any remedy whose action

induces such tone in a debilitated state of the digestive organs.

PETIT ST. SAUVEUR.

This is a plain unpretending establishment, containing twelve *cabinets de bains*; and its waters possess the same mild non-irritating medical properties, as those of St. Sauveur, in the valley of Luz, which we have already fully described.

CHAPTER XIX.

OBSERVATIONS ON THE PARTICULAR INFLUENCE OF THE WATERS
OF THE EAUX-BONNES AND EAUX-CHAUDES ON DISEASE.
RESUME OF THE FACTS AND REASONINGS CONTAINED IN THE
WORK, IN REFERENCE TO THE ACTION OF THE SULPHUROUS
WATERS. TABLE OF THE APPROXIMATE PATHOLOGIC CONDI-
TIONS OF THE SYSTEM, AS TO THE TYPE OF DISEASE AND
TEMPERAMENT OF THE PATIENT, APPLICABLE TO EACH
SOURCE, IN RELATION TO ITS STRENGTH OF MINERALIZATION
AND HIGH DEGREE OF TEMPERATURE. EAUX-BONNES. ITS
WATERS, ETC. EAUX-CHAUDES. ITS WATERS, ETC.

HAVING completed the description of those watering-places in the Hautes Pyrénées which entered into our plan, we would now conduct the reader to the only remaining two to which we shall direct our attention, namely, the Eaux-Bonnes and Eaux-Chaudes, in the department of the Basses Pyrénées, and which have long enjoyed a prominent reputation. From Cauterets, indeed, to the enterprising traveller on horseback, there is a rough mountain track leading to the Eaux-Chaudes, and thence to the Eaux-Bonnes, by the Spanish watering-place, Penticosa, in Arragon; and where, in the contemplation of magnificent scenery, he will be well remunerated for the fatigue of bad roads and other inconveniences. But for persons *en voiture*, and particularly for those

travelling *post*, there is no other route to the Eaux-Bonnes and Eaux-Chaudes, except by turning back on Pau, the central point.

We feel that the remaining part of the task to be completed will not be a tedious one. Already have the ample discussions, which have taken place on the general therapeutic action of the sulphurous waters of the Pyrénées, and the minuter application of *principles* to the details of disease in the chapters on Barréges and Cauterets, conveyed a tolerably clear idea of the *modus operandi* of these powerful curative agents in different pathologic states of the human frame; so that it is now difficult to throw much additional light on the subject in this chapter, on the Eaux-Bonnes and Eaux-Chaudes. It is left for us, therefore, simply to give such descriptions of these watering-places and their vicinity as may be amusing to the invalid; together with the analysis of their waters; and the shades of diseases, which, from the lower state of mineralization of these waters than most others of the Pyrénées, are more appropriately submitted to their influence, and such as are recommended by experience and sanctioned by science.

That the climate of a watering-place is no mean auxiliary to the action of the waters, and that it induces a modification of their powers, there can be little doubt. It may be partly for this reason that the climate of the Eaux-Bonnes, more sedative than that of the other *sulphurous* watering-places of the

Pyrénées, has conspired with their comparatively non-irritating waters, to render them a safe remedy, even when the structure of the lungs has become primarily affected, and, by acting beneficially in restraining the circulatory number, prevent the increase of, and even allay, pulmonary irritation.

It is quite certain, from experience, that the waters of the Eaux-Bonnes, taken at their source, may be ventured upon with the presence of urgent chest-symptoms, when we would not dare to prescribe, under similar circumstances, the waters of Cauterets. Still the ground, when the substance of the lungs themselves is really affected with scrofulous disease, is a very limited and debateable one for treatment by the means even of these milder waters.

Again, we are of opinion, that in any affection of the lungs, which has derived marked alleviation from the climate of Pau, and where it may be considered desirable to try the Pyrenean waters as a remedy, the Eaux-Bonnes is the best situation in the Pyrénées to afford the experiment a fair trial.

If we subtract the inconvenient nature of its site, built in a narrow ravine, which acts with funnel-like attraction to all the winds that may be rumbling and tossing about on the higher valley of Gabbas, yet the waters of the Eaux-Chaudes are very useful in those cases where, from irritability of habit, or strong tendency to vascular excitement,

or from the presence of some increased vascular action, either connected with the disease or accidentally mixed up with it, the stronger waters of the Hautes Pyrénées would not only not alleviate, but decidedly aggravate disease connected with such contra-indicating contingencies. When we reflect that the qualities of the sulphurous waters of the Hautes Pyrénées, generally, are beneficial, inversely as the strength of their mineralising properties and temperature, in relation to the state of *tone* and liability to excitement, and the reverse; it is clear, that the waters of the Eaux-Chaudes, which are the least mineralized of all the Pyrenean sulphurous springs, may be useful in diseases of the generic character usually benefited by the different sources, even although connected in some degree with the drawback of comparatively increased tone and vascular action. And experience proves the truth of this doctrine.

We, therefore, wish to convey the idea, that the diseases for which the Eaux-Chaudes are indicated are those which have not run a protracted and chronic career; but rather, cases where there is still some activity of symptoms either essential or accidental.

In connexion with this subject, and as a convenient opportunity to give a *résumé* of the inductions, from the facts and reasonings scattered over the part of this work which has reference to the sulphurous

waters of the Pyrénées, we have prepared an approximate table of the pathologic conditions of the system, as to the type of disease and the temperament of the patient, taken in relation to the degree of mineralising power and thermal temperature of the different sources, and as appropriate to them. But before submitting this table, we shall reproduce in a concise form the leading principles which ought to regulate us in forming a correct estimate of the subject.

1. The majority of scientific men, who have studied the virtues of these waters, are of opinion that their activity, as a curative agent, is in proportion to the quantity of sulphuret of sodium they contain, and the degree as to elevation of thermal caloric combined with them.
2. The direct effect of all sulphurous mineral waters is to stimulate the circulation in, and pervade the structure of, every tissue, whether in health or in disease.
3. That they are, consequently, contra-indicated in all cases where there is present active inflammation of any tissue.
4. That they are more favourably suitable to persons of a lymphatic and leucophlegmatic temperament, and those debilitated by disease, the natural tone of whose habit has been thus considerably lowered, than to the nervo-sanguine.
5. That, however, when all active symptoms have ceased in maladies not connected with internal organs, however severely they may have raged, and where the effects to

be obviated are the usual consequences of increased action, the waters may be advantageously used, provided the natural temperament be not too highly sanguine, or if so, provided artificial means are used to reduce its standard to the point, that in acting upon a local injury, we do not rouse up a constitutional disturbance dangerous to the powers of life.

6. That, *à fortiori*, they are pre-eminently indicated in all functional diseases depending on general atony; and in all chronic lesions of long standing not affecting the nobler organs of the body. 7. That they may be used in some states of inflammation of a subacute kind; but in this case the waters, possessing the weakest principles of mineralization, united to the lowest thermal temperature, are those to be employed in preference; particularly if this inflammatory action be in organs necessary to life. The following table will explain and bear out these views:—

Source.	Thermal Establishments.	Quantity of Sulphure of Sodium.	Temperature.	Pathologic state of the system, as to type of disease and temperament of the Patient, applicable to each source.
Grand Douche	Barréges	0·0498	114°	Invertebrate maladies of the skin ; consequences to joints, muscles, and tendons, from acute attacks of rheumatism and rheumatic gout; loss of power of limb from causes not cerebral; anchylosis; spontaneous luxations; deep-seated irritation, from deposits of matter, carious luxations or foreign bodies lodged; consequences of phlegmatis dolens ; neuralgia ; ill-conditioned ulcerations, scrofulous and others, and invertebrate fistulous sores.
Buvette	Ditto	0·0321	109	
Bruzaud	Cauterets	0·0385	104	
Espagnoles	Ditto	0·0344	122	
César	Ditto	0·0303	124	
Pause	Ditto	0·0303	115	
Bain de Fond	Barréges	0·0270	97	The same diseases as above in persons of more excitable temperament.
St. Sauveur	St. Sauveur	0·0253	92	In milder forms of the same diseases in women, children, and persons of nervous temperament.
Buvette	Eaux-Bonnes	0·0251	90	In diseases of the air-tubes and pulmonary apparatus, and first threatening indications of consumption ; more suited to these cases than other waters, from not over-exciting the pulse, in properly-regulated doses.
La Douche	Ditto	0·0251		Much the same qualities as St. Sauveur.
Source Tempérée	Barréges	0·0245	92	In abnormal states of the mucous membrane ; effects very decided in restoring healthy secretion and improving organic tone ; in weakened organic tone, generally unaccompanied with serious lesion.
La Raillère	Cauterets	0·0194	104	In nervous rheumatic gout, unaccompanied with inflammation.
Le Pré	Ditto	0·0159	120	
Le Bois	Ditto	0·0140	122	
Maounhourat	Ditto	0·0124	131	Most efficacious in atonic dyspepsia; highly diffusible and diuretic.
Petit St. Sauveur	Ditto	0·0121	97	The same virtues as St. Sauveur proper; but milder.
Lesqurette	Eaux Chaudes	0·0090	94	In affections of a recent nature, such as bronchitis, rheumatalgia, and mild cases of rheumatic gout, &c., &c., where, from being complicated with a tonic temperament, or from some accompanying inflammatory irritation, the stronger waters would aggravate the malady.
L'Arressecq	Ditto	0·0080	77	
Baudot	Ditto	0·0086	81	
Le Clot	Ditto	0·0063	96	
Le Rey	Ditto	0·0063	92	

The Eaux-Bonnes and Eaux-Chaudes are twenty-six English miles from Pau, and nearly equidistant from this latter town. One excellent road, kept in excellent order, (and where do we find better roads than in the Pyrénées?) leads to the village of Laruns, at the feet of the great Pyrenean chains, and three miles from both watering-places. Here the roads divide almost at a right angle, that to Eaux-Bonnes taking an easterly direction up a gorge lying under the shadow of the Pic de Gers, which may be seen towering over its lofty neighbours from the Place Royale at Pau; the other striking through an artificial pass in the mountain up the valley of Gabbas, through Eaux-Chaudes in its way over the frontier near the Pic de Midi de Pau. The road from Pau to these watering-places runs directly south over the Gave, and a mile distant from Pau dives amidst the luxuriantly wooded côteaux of Gelos and Turançon, which, under other names, succeed each other for miles, until we fairly emerge into the plain of Arudy.

The first five miles of this road to Gan, is very well known to the invalid society of Pau, as being the usual promenade, the road being picturesque, and at the same time well sheltered. In every direction along the côteaux which skirt this beautiful drive, we find country-houses, whose situations are judiciously chosen in reference to the views and freedom from atmospheric inconveniences. On the right, in one of the houses on the hill, we see the

mansion where Lord Elgin spent many years as a prisoner on *parole* after having suffered an imprisonment in the Château of Lourdes. The first village five miles from Pau is Gan, one of the thirteen ancient towns of Bearn, which were regularly fortified, having had its inclosing wall with flanking towers and surrounding ditch, of which some remains have come down even to the present time. It had in its day sustained many sieges; and as a recompense for the valour displayed, it had the name of Gan, a corruption of *gagner*, to win, given to it, which it still proudly preserves. Amidst other historical personages to whom this village gave birth, we mention Marca, born in 1594, the historian of Bearn, and who ultimately became Archbishop of Paris on the disgrace of the Cardinal de Retz.

There is nothing interesting beyond the scenery to detain us on the road. We pass through the villages of Rebenac, Sevignac, Louvie, and Laruns; and thence proceed we first to Eaux-Bonnes.

In a *cul de sac* crouching under the protection of mountains 8000 feet high, we find the renowned little watering-place, Eaux-Bonnes. This fame does certainly not, in any degree, depend upon its size, for there are not twenty houses in the place; still five or six hundred invalids are annually accommodated at prices which are rather startling.

We do not find here, as at Bagnères de Bigorre, Cauterets, and other watering-places in the Pyrénées,

nées, evidences that the Romans were acquainted with, or patronised the waters of Eaux-Bonnes. But most interesting recollections are cherished of Margaret of Anjou, whom gallantry had raised to the rank of the fourth Grace and tenth Muse. These waters derived no small fame likewise from their healing properties so eminently displayed after the battle of Pavia, when Henri d'Albret, grandfather of Henri Quatre, brought his wounded followers to this source, which received, on this account, the name of Eaux-d'Arquebusades.

The village of Eaux-Bonnes has an elevation of 2100 feet above the level of the sea. The air is pure and fresh, and from its topographical position is less agitated by winds than many other places in the mountains, and consequently more suited to pulmonary irritation than any other sulphurous watering-place of the Pyrénées. There are several cascades to be seen in the neighbourhood, and many excursions on horseback among the mountains.

In the locality of the Eaux-Bonnes there exist five distinct sources. 1st. La Source Vieille, which furnishes the water to the fountain for the drinkers and four baths—temperature 88°. 2. La Source Nouvelle, (86°) reserved for the purpose of having its temperature artificially raised. 3. La Source de la Douche, (91°) supplies four or five baths and a douche. These three sources supply the thermal establishment. There are two others little used,

although Dr. Daralde, the inspector, has recently made experiments with regard to one of them, highly sulphurous, but of a low temperature (54°), and thinks that it may be advantageously used in atony of the digestive organs. The following is the result of an analysis made by Monsieur M. O. Henry, of a quart of the water:—

Nitrogen gas	...	...	...	traces
Carbonic acid gas	...	...	quart	0'0064
Hydrosulphuric acid gas	...	...	...	0'0055
<hr/>				
Chloruret of Sodium	...	grains	0'3432	
— of Magnesium	...	do.	0'0044	
— of Potassium	...	...	traces	
Sulphate of Lime	...	grains	0'1180	
— of Magnesia	...	do.	0'0125	
Carbonate of Lime	...	do.	0'0048	
Sulphur	...	...	traces	
Silex and Oxide of Iron	...	grains	0'0160	
Organic matter containing Sulphur	do.	0'1065		<hr/>
		0'6054		

Monsieur Longchamp has found the following quantity of sulphuret of sodium in these sources of Eaux Bonnes—water a quart.

La Buvette	...	...	...	0'0251
La Douche	...	...	...	0'0251

Little remains to be said as to the medical properties of the Eaux-Bonnes waters, as we have already exhausted the subject. We shall conclude, however, by giving a quotation from the work of

Theophile Bordeu, the author of *Pyrenean Mineral Springs*, and some remarks from the report of Dr. Daralde, the present very able Inspector of the Eaux-Bonnes. "It is to us (says Bordeu) that the internal use of the waters of Bonnes is owing, and their application to maladies of the chest, and the fortunate celebrity which they have acquired: they have cured some persons affected with pulmonary maladies, and have alleviated a great number. Unknown in France up to this period, their fame has extended even to the capital, into the most remote provinces, and into the country of the stranger." "I have seen, however, cases of ulceration of the lungs, which the waters of Bonnes could not save from death; in some they increased the expectoration, in others they decidedly diminished it. Some experienced, the first few days, an insidious amelioration, shortly followed by suddenly fatal results*."

Dr. Daralde, in his report for the year 1835, gives seventeen instances, to shew that in pulmonary consumption, arrived at the third stage, the waters of the Eaux-Bonnes, in a very few days, fatally aggravated the disease, and the patients suddenly sank. In thirty-three cases of consumption in the first and second stage, the condition of the patient was found ameliorated and the cough entirely to disappear. In seventeen cases of chronic laryngitis with or without

* *Récherches sur les Maladies Chroniques.*

loss of voice, four were perfectly cured: the other invalids experiencing a marked amelioration. Out of seventeen persons suffering from chronic pulmonary catarrh, four were cured, the cases of the others ameliorated, and the patients got into condition.

The number of persons, in 1840, who took these waters was approximatively calculated at 2,800; 6000 baths and douches were given; and 50,000 bottles of the water exported to all parts of the world, from New York to Canton.

To proceed to the Eaux-Chaudes, it is necessary to return to Laruns. Here we commence a short but rapid ascent, which leads through a narrow pass cut in the rock. The moment of our emerging from this pass brings before us the valley of the Eaux-Chaudes; and it has been remarked more than once to us, that the view from this spot resembles very much some of those varied ones on the Simplon.

The Eaux-Chaudes is a petty village composed of some dozen houses, worse built and worse supplied with accommodations, than any other of the watering-places. The sources are called Eaux-Chaudes from a sort of *lucus a non lucendo* reason, because they are the most temperate of all the Pyrenean sources. But this is not the only thing to be met with at the Eaux-Chaudes during the season, which is not exactly that which it is represented to be,—*verbum sat*. The village is hemmed in, on one side, by a lofty perpendicular mountain;

on the other, the uproarious Gave confines it, within a space of a few yards, so that it is upon this little platform of mountain débris that the houses are built. The sternness of nature has said to speculators in building, *Thus far shalt thou go and no farther*, for all the available territory has been already grasped, on which have been erected the few houses which constitute the village.

A splendid thermal establishment in marble, projected by the public spirit of M. Dûchatel, the late Préfet, is now in course of erection, in which the different sources will be utilised to the greatest advantage.

The scenery surrounding the Eaux-Chaudes is of the most magnificent character, and the excursions may be much varied in search of the picturesque. A very common one is that to Gabbas, six miles distant, where one comes within apparently hailing distance of the Pic de Midi de Pau. Should the day be clear, as happened last April to the Author, accompanied by some kind English friends, who, on reading this, will look back with satisfaction to the pleasures of that excursion, nothing can exceed the beauty of the scenes.

There are six sources at the Eaux-Chaudes, namely; 1. Lou Rey (93°). 2. L'Esquirette (95°), the most highly mineralised of the sources, and in greatest repute among the invalids. 3. Le Clot ($97\frac{1}{2}^{\circ}$). 4. Larressec (77°). 5. Baudot (82°). 6. Mainvielle

(52°). Of these six, the three first are employed in bath and douches, and the three last internally. Of all these sources, the only ones known in 1780 were Lou Rey and L'Esquirette.

A chemical analysis of these waters has been made by M. Longchamp, who found sulphuret of sodium, traces of free alkali, sulphate of lime and silex. The most sulphurous of the sources, L'Esquirette and Laressecq, contain only one-third of the sulphuret of sodium to be found in the Eaux-Bonnes, and these last only contain two-fifths of that of the Grand Douche at Barréges.

It is unnecessary, after all that has been already said, to enter at any length into the individual medical properties of these sources. The establishment has the good fortune, in Dr. Baile, to possess an instructed and experienced physician inspector, who knows how to apply the requisite source to the appropriate symptom; and in his hands, their administration may be with confidence and safety left. We shall only make one observation, that so beneficial do they appear to be in some descriptions of rheumatism, that persons among the peasantry, who come from a distance on crutches, frequently return home on foot.

In conclusion, the Author trusts, that he has fulfilled the intention expressed in the outset, to point out some leading principles, as applicable to the sanative influence of the Climate of Pau, and of

the mineral waters of the Pyrénées, on disease, which may guide the distant invalid when to seek and when to avoid these curative agents. If this work shall be the means of preventing useless and painful journeys, or of stimulating others to avail themselves of the remedial means here pointed out, he shall not have written in vain.

FINIS.

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